UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D. C.

TECHNICAL ADVISORY BOARD August 19, 1938

Technical Advisory Board Circular No.1

Subject: Copies of Current Bureau Specifications Requested.

To Chiefs of Bureaus and Offices:

In order that the Technical Advisory Board may proceed with the development of standard specifications, as contemplated under numbered paragraph 3 of the Secretary's memorandum of June 8, 1938, creating the Board, will you please submit to this Board the latest current specifications as used in your Bureau covering the following:

Automotive Equipment
- a. Passenger vehicles
- b. Three-quarter to one ton trucks
- c. Light one and one-half ton trucks
- d. Heavy one and one-half ton trucks.

Farm and Related Equipment
- a. Conventional four-wheel tractors
- b. Cultivating type tractors
- c. Crawler type tractors
- d. Terracers

Highway and Construction Equipment
- a. Tractor trailbuilders
- b. Motor patrol graders
- c. Air compressors
- d. Pull type of grader

Your comments on these specifications, together with such detailed recommendations as you desire to make, will be appreciated and should be received by the Board not later than August 27, 1938.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D. C.

Technical Advisory Board

September 14, 1938.

TECHNICAL ADVISORY BOARD CIRCULAR NO. 2.

Subject: General Provisions Applicable to Invitations for Proposals on Materials, Etc.

To Chiefs of Bureaus and Offices:

In conformity with the Secretary's memorandum of June 8, 1938, outlining its duties, the Technical Advisory Board proposes to develop and promulgate a set of General Provisions which shall be applicable in whole or in part to all proposals for equipment, materials, etc. The general use of such a document should result in considerable saving in clerical work, since it will obviate the necessity of much of the stencil cutting incident to the preparation of a complete new text for each separate advertisement as is the case at present.

Two copies of a draft of the proposed provisions are attached. Your comments and recommended changes, if any, are requested so as to reach this office not later than September 26, 1938.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
SPECIFICATIONS FOR EQUIPMENT, MACHINERY, MATERIAL, ETC.

GENERAL PROVISIONS TO APPLY TO SPECIFICATIONS.

The following paragraphs under "B-General Provisions" are not applicable to this proposal:

_____
_____
_____
_____
_____

A. Applicable Specifications.

A-1. The following specifications of the issue in effect on date of invitation for bids shall form a part of this specification:

(a). Federal specifications:

_____
_____
_____
_____
_____
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_____

(b). Departmental Specifications:

_____
_____
_____
_____
_____
_____
_____
_____

B. General Provisions.

B-1. This specification describes equipment, machinery, material, etc. of the type and kind called for in the invitation for bids. Parts, units, etc. not specifically mentioned which are necessary to provide a complete working unit shall be furnished by the successful bidder, and shall conform in strength, quality of material and workmanship to that usually provided by standard engineering practice in the industry concerned. All parts, units, etc., shall be of such size, material, design and strength, using an appropriate factor of safety, to insure the ability of the unit to withstand the extremes of stress, vibration and impact likely to be encountered in service described. Sheet metals shall be of suitable grade and guage made from rust-resisting material or the surface shall be treated to retard rusting. Only selected grade, straight grained close texture, seasoned wood shall be used and it shall be of a variety that reduces to a practicable minimum the possibility of dry rot.

B-2. The equipment offered must meet the following requirements, and in addition, must encompass such special details as are herein specified. It must be of the latest model and one in production by the manufacturer at the time of delivery. The Government reserves the right to reject any and all bids wherein deviation from or compliance with these specifications are matters of conjecture and cannot be ascertained by definite, recognized standards. It also reserves the right to accept bids deviating slightly, or in minor details from these specifications, where such acceptance is to its best interests. The right is also reserved by the Government to split items between bidders or otherwise award in such combination as will best meet the current needs of the Government.

B-3. In the consideration of bids the following apply:

B-3a. Bids will not be considered unless the actual equipment manufacturer is engaged, at the time the bids are opened, in the production of the units as specified, and as consideration of performance under service conditions is an important factor in the case of equipment of this type and class, it is required that the bidder shall furnish proof that the manufacturer of the equipment offered under his bid has been continuously engaged in the production of similar equipment for a period of at least 2 years previous to the opening date of the invitation for bids or has the ability and facilities to produce equipment offered under this bid, or if any of these conditions do not apply he shall furnish a 100 per cent service bond for a period of 1 year. It is required that the equipment, including all units and component parts thereof, be of the latest

design, conforming to the manufacturer's latest current production manufacturing practices and that current production practice shall not be deviated from except where deviation is definitely required to comply with the requirements of this specification. Rejected parts or units of outmoded parts, and units pertaining to obsolete or discontinued models improvised for this purchase will not be permitted in the assembly of the equipment.

B-3b. The equipment offered must meet in every essential particular the requirements of the specification and in addition, must encompass such special details as are herein specified. It must be of the latest model and one now in production by the manufacturer. The manufacturer shall submit evidence that the complete unit bid on has passed the experimental stage to the point where one or more such units are now operating economically and efficiently in Field Service under Conditions similar to those set forth under Service Requirements.

B-3c. Proposals from firms in the hands of receivers shall be considered only when in the judgment of the Government the bidder is not likely to discontinue production. This restriction is necessary because of the importance of having available, throughout the life of the equipment, repair parts, services of expert factory representatives and other advantages reasonably to be expected in the case of firms operating without restriction under their own officers.

B-3d. Each bidder must submit complete specifications, descriptions and cuts or drawings of the equipment bid on with a statement listing all details wherein the equipment offered fails to meet the specifications attached hereto. Failure to meet this requirement and/or the specifications herein given, will be sufficient cause for rejecting any bid.

B-4. The following guarantees are required:

B-4a. Bidder shall guarantee that the equipment, component units and parts will be suitable for the work to be performed; will be constructed to definite standard dimensions, with proper clearances and fits, that previously published or set ratings will not arbitrarily be raised without prior approval of the actual unit manufacturer; and further, that the equipment offered will comply in every respect with the terms of this specification. In the event that the equipment does not fully comply with this specification the bidder

shall state definitely, in his answers to the questionnaire with reference to the proper paragraph in the specifications, wherein the equipment he proposes to furnish does not comply. The questionnaire must be completely filled out by the bidder.

B-4b. The successful bidder shall guarantee the equipment against defective material and workmanship; and in the case of motorized vehicle equipment, excessive front wheel shimmy and tramp; excessive spring set; gear hopping and objectionable gear noises, leakage of lubricants; cracking and sagging of frame members; loosening and breaking of rivets; cracking, splitting, warping and dry rotting of wood structure. This guarantee shall be effective for a period of ninety (90) days, or for four thousand (4,000) miles of road travel in case of motor vehicles, whichever condition shall first occur, except that in the case of dry rot, the mileage condition shall not apply. He shall further guarantee the equipment against faulty design and materials developing during a period of one (1) year or eight thousand (8,000) miles of road travel in case of motor vehicles, whichever condition shall first occur that results in recurring maintenance and part or unit replacement being required.

B-5. As the continuous operation of the equipment covered by this specifications is of utmost importance, it is necessary that the successful bidder be in a position to render prompt service in furnishing replacement parts. Bidders shall, accordingly, indicate the extent of their service facilities by placing on file with the Purchasing Department a complete list of their branch offices, agencies and dealers where repair parts can be secured, or submit the required list with their bid.

B-6. The successful bidder shall furnish one operator's handbook and one lubrication chart for each piece of equipment supplied. The Operator's hand-book shall clearly describe operating features and adjustments. The lubrication chart shall be complete and of such a size that points requiring lubrication are clearly illustrated and the lubricants recommended clearly shown. Recommended lubricants shall be shown for each unit furnished for varied climatic conditions. There shall also be furnished by the successful bidder such number of complete parts lists as may be specified by the Purchasing Department in the invitation for bids. In the case of motor vehicles the data shall cover the chassis, cab and body constructional details and accessory equipment required to be furnished.

The parts lists shall be so numbered that every part can be readily identified by the user, the equipment producer's service agencies and dealer organizations. The data mentioned herein shall be furnished at the time of the delivery of the equipment, unless otherwise directed by the Purchasing Department. Certificate of ownership or bill of sale shall be furnished when so specified in the invitation for bids.

B-7. All processes of manufacturer and assembly of the equipment and its parts shall be subject to inspection by a representative of the Government, at the manufacturer's plant. Manufacturers shall furnish for use by the inspector, all tools, guages, instruments, and such assistance as the inspectors may find necessary. After complete assembly of the equipment, a thorough examination may be made to insure that all parts of the equipment and accessories are properly adjusted and function smoothly and dependably.

B-8. Subparagraphs (a) and (b) and (c) apply when Purchasing Department does not require unloading and servicing at destination. The provisions for loading, unloading, servicing and otherwise conditioning a unit for operation as set forth in the following paragraphs intends similar or equivalent processing of analogus and corresponding assemblies for any and all apparatus purchased hereunder.

B-8a. When bids are called for f.o.b. factory, with shipment by rail or water on Government bill of lading, or drive-away by Government personnel in the case of motor vehicles, or f.o.b. destination, with shipment by rail or water on commercial bill of lading, or truck-away delivery, the contractor will be required to service the equipment as prescribed in subparagraph (b), prior to shipment and to prepare and load the equipment in a manner conforming to the best approved commercial shipping practice. When shipment is to be made on Government bill of lading, the loading into the car will be done by the bidder by the method most economical to the United States and in accordance with the data furnished by the bidder under proper paragraph of the Questionnaire; i.e., the number of pieces of equipment stated will be loaded in the railroad car of the size and type designated in the Questionnaire unless a change is directed by the Purchasing and Contracting Officer, and the actual shipping weight shall not exceed the shipping weight shown under Questionnaire.

B-8b. In the servicing of the equipment at the manufacturer's

plant, it is required that they shall be completely assembled, all equipment installed, all adjustments properly made and equipment serviced for continued operation. In the case of motor vehicles, every unit shall contain the recommended grade of lubricant and shall be filled to the proper operating level, the battery shall be fully charged, lights focused, brakes adjusted, tires suitably inflated, and front wheels properly aligned. When servicing equipment at the manufacturer's plant for "drive-away" by Government personnel, the servicing operations shall include those previously enumerated and in addition, the fuel tanks shall contain 10 gallons of motor gasoline of a grade at least equal to that covered by Federal Specification VV-M-571, and the cooling system filled to the proper operating level with a liquid suitable for the climatic conditions existing over the area that will be traveled between the manufacturer's plant and ultimate destination.

B-8c. Before acceptance at delivery point the Government may check any or all machines to ascertain that all specifications as herein described are fully met and that machines are in working order and only those machines as meet these requirements will be considered or accepted.

B-8d. If the Purchasing Department indicates in the invitation for bids that the equipment will be inspected at the factory or assembly plant prior to shipment, the contractor shall notify the Purchasing Department in writing 10 days prior to the date on which the equipment will be ready for shipment. Should it develop that the equipment is not completed to such an extent as to justify inspection, a reinspection will be made and the cost of such reinspection, including salary of the inspector, his traveling and other expenses, shall be borne by the contractor and will be deducted from any money due him on his contract. Should the Purchasing Department fail to make prompt inspection when notified by the Contractor, any delay resulting, when determined, will constitute an extension of time under paragraphs B-12 and B-13.

B-9. Subparagraphs (a), (b), (c) and (d) apply unless otherwise specified when Purchasing Department requires unloading and servicing at destination. If equipment is accepted at destination or f.o.b. factory for shipment on Government bill of lading to destination, unloading, delivery to and servicing at destination will be required as follows:

B-9a. When shipment is made to consignee on Government bill of lading the price f.o.b. bidder's shipping point shall include unloading at railhead delivery at final destination and servicing as specified in (c) below.

B-9b. It is necessary that equipment be delivered to the consignee with the least possible travel on its own wheels. Accordingly, it is understood and agreed that the bid price "delivered" shall contemplate transportation from that point of origin (factory or assembly plant) to the railhead nearest destination by some means, involving no road travel on the equipment's own wheels, and from such railhead to consignee by overland drive or some other means.

B-9c. In the servicing of the equipment at destination, it is required that the equipment be completely assembled, all accessories installed, all adjustments properly made and unit serviced for continued operation. The crankcase shall be filled to the proper operative level with a commercial grade of lubricant of the vicosity recommended by the manufacturer for the "run-in" period; lights focused, generator adjusted to handle ample current for ignition and lighting, brakes adjusted, tires inflated and front wheels aligned; the transmission, universal joints, and rear axle differential housing shall be filled to the proper operating level with a commercial grade of lubricant as recommended by the manufacturer and suitable for the season current at time of delivery in latitude of delivery points; the wheel bearings shall be properly packed with grease; the entire chassis lubricating system shall be completely serviced, and the battery fully charged, and the cooling system shall be filled to the proper operating level with water, or if necessary due to seasonal weather conditions at time and latitude of delivery point, with a suitable mixture or solution having a sufficiently low freezing point to permit normal operations without risk of freezing.

B-9d. Drive-away delivery by the contractor, in lieu of rail, water or truck-away shipment, will not be permitted--unless specifically authorized in the invitation for bids, or as directed by the Purchasing and Contracting Officer.

B-10. When specified in the invitation for bids and involving motor vehicles, after 1,000 miles of operation the contractor shall give the truck complete inspection and make all adjustments which may be necessary.

B-11. The equipment for which bids are invited in this proposal is urgently needed. Therefore, in making awards and determining low bidder, delivery time will be evaluated by adding 1% of the bid price to the bid price for each calendar day in excess of 75 days delivery at factory and 82 calendar days delivery at destination when the amount of the bid involved exceeds $250,000.00; in excess of 60 calendar days delivery at factory and 67 calendar days delivery at destination when the amount of the bid involved exceeds $150,000.00 but not more than $250,000.00; in excess of 45 calendar days delivery at factory and 52 calendar days delivery at destination when the amount of the bid exceeds $75,000.00 but not more than $150,000.00; 30 calendar days delivery at factory or 37 calendar days delivery at destination when the amount of the bid involved exceeds $50,000.00 but not more than $75,000.00; in excess of 25 calendar days delivery at factory and 32 calendar days delivery at destination when the amount of the bid involved exceeds $25,000.00 but not more than $50,000.00; when the amount involved is less than $25,000.00 delivery time will be evaluated at the same rate per day in excess of the number of days stipulated in the bid proposal which is considered to be a reasonable period for delivery of the equipment described herein.

B-12. After award is made to a bidder, if he fails to make shipment from factory or stock points or delivery at destination within the time and/or at the rate specified by him for the respective items, there will be deducted from payment to him, as a liquidated damage, not as a penalty, 1% of purchase price per unit delayed for each calendar day of delay.

B-13. Delays - Liquidated Damages. If the bidder who receives an award under this advertisement (hereafter referred to as "Contractor"), refuses or fails to make delivery of the materials or supplies within the time specified for the item or items awarded him, or any extension of such time, the actual damage to the Government for the delay will be impossible to determine, and in lieu thereof the contractor shall pay to the Government, as fixed, agreed, and liquidated damages for each calendar day of delay in making delivery, the amount as set forth in the specifications or accompanying papers, and the contractor shall be liable for the amount thereof: Provided, however, That the Government reserves the right to terminate the right of the contractor to proceed with deliveries or such part or parts thereof as to which there has been delay, and to purchase similar materials or supplies in the open market or secure the manufacture and delivery thereof by contract or otherwise, charging against the contractor

any excess cost occasioned the Government thereby, together with liquidated damages accruing until such time as the Government may reasonably procure similar materials or supplies elsewhere: Provided further, That the contractor shall not be charged with liquidated damages or any excess cost when the delay in delivery is due to unforeseeable causes beyond the control and without the fault or negligence of the contractor, including but not restricted to acts of God or the public enemy, acts of the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, and delays of a subcontractor due to such causes unless the contracting officer shall determine that the materials or supplies to be furnished under the subcontract are procurable in the open market, if the contractor shall notify the contracting officer in writing of the cause of any such delay, within 10 days from the beginning thereof, or within such further period as the contracting officer shall, with the approval of the head of the department or his duly authorized representative, prior to the date of final settlement of the contract, grant for the giving of such notice. The contracting officer shall then ascertain the facts and extent of the delay and extend the time for making delivery when in his judgment the findings of fact justify such an extension and his findings of fact thereon shall be final and conclusive, subject only to appeal, within 30 days, by the contractor to the head of the department concerned or his duly authorized representative, whose decision on such appeal as to the facts of delay and the extension of time for making delivery shall be final and conclusive.

B-14. The successful bidder will be required to furnish Warranty and Service bond in the amount of fifty per cent of contract price. Bond guarantee to be effective for period of one year starting from receipt date of equipment at destination or for a distance of 4,000 miles, whichever condition first expires. In this connection bidders are advised that an annual performance bond, in the amount of $25,000.00 covering Warranties and Service, will be accepted in lieu of individual bonds as heretofore required with reservation that the amount of annual bond may be increased prior to any purchase if deemed necessary by the Government.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D. C.

Technical Advisory Board.

September 23, 1938.

TECHNICAL ADVISORY BOARD CIRCULAR NO. 3.

Subject: Copies of Inventories of Motorized and Heavy Duty Equipment.

To Chiefs of Bureaus and Offices:

In accordance with the Secretary's memorandum of June 8, 1938, numbered paragraphs four and five, will you please furnish the Technical Advisory Board a copy of the annual inventory of your Bureau for the calendar year of 1938, covering motor vehicles, motorized, power operated, and heavy duty equipment used in the activities of your Bureau. Heavy duty equipment to include all units costing $200.00 and over.

In indicating the condition of the equipment, it is requested that the following terms as defined be employed:

New: Never been in use.

Excellent: In a condition having a useful life and capacity approximately equal to new.

Good: Used slightly or overhauled and re-conditioned so as to have a capacity and life of at least 75% of new equipment.

Fair: Used but still in condition to deliver capacity or life equal to 50% of capacity and life of new equipment.

Poor: In no condition to deliver normal service without excessive repair, (at least 50% of original cost) operating and maintenance cost.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D. C.

Technical Advisory Board

October 27, 1938.

TECHNICAL ADVISORY BOARD CIRCULAR NO. 4.

Subject: Standard Specifications Covering Motor Propelled Passenger Carrying Vehicles.

To Chiefs of Bureaus and Offices:

In conformity with the Secretary's memorandum of June 8, 1938, outlining its duties, the Technical Advisory Board has prepared standard specifications covering four classes of passenger-carrying motor vehicles, for use by all Bureaus of the Department.

Two copies of the proposed specifications Nos. A-MVA-111, A-MVA-112, A-MVA-113, and A-MVA-114 are attached. Your comments and recommended changes, if any, are requested, to reach this office not later than November 14, 1938.

OTTO ENGELMANN

(Enclosure)

Chairman, Technical Advisory Board

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles

Spec. A - MVA 111.
October 27, 1938.

C- Service Requirements

Bureau to furnish service requirements to cover the needs of a light car which can be used for city and interurban service when power, wheelbase and weight is not an essential requirement.

D- Specifications

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described.

D-2. Power Unit.

The power unit must be of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

Number of cars_____can be loaded in a freight car of_____ feet_____inches.

Shipping weight is_____pounds.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles

Spec. A - MVA 111.
October 27, 1938.

C- Service Requirements

Bureau to furnish service requirements to cover the needs of a light car which can be used for city and interurban service when power, wheelbase and weight is not an essential requirement.

D- Specifications

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described.

D-2. Power Unit.

The power unit must be of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltabe regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

Number of cars_____can be loaded in a freight car of_____ feet_____inches.

Shipping weight is_____pounds.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 112
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a light weight car, of approximately 112" wheelbase and when power is an essential requirement. If necessary, state here minimum power required.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C- Service Requirements and cover the type of car which by experience has shown will satisfactorily meet these requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of the body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be shatter-proof type.

Number of cars _____ can be loaded in a freight car of _____ feet _____ inches.

Shipping weight is _____ pounds.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 112
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a light weight car, of approsimately 112" wheelbase and when power is an essential requirement. If necessary, state here minimum power required.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C- Service Requirements and cover the type of car which by experience has shown will satisfactorily meet these requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of the body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be shatter-proof type.

Number of cars _____ can be loaded in a freight car of _____ feet _____ inches.

Shipping weight is _____ pounds.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 113
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a medium weight (3,100 pound) car.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C-Service Requirements and cover the type of car which by experience has shown will satisfactorily meet the requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described, having a wheelbase of not less than 115 inches. A shorter wheelbase will not be acceptable as cars with a shorter wheelbase do not have the sturdy chassis construction required by these specifications.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5 Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

D-9. Weight Requirements.

The complete vehicle, less bumpers, tool kit, gasoline and water shall weigh (3,100 pounds if four-door type) (3,050 pounds if two-door type) (3,000 pounds if coupe type), as indicated in the invitation to bid. A deviation of not more than six (6%) per cent over or under the weight will be accepted. A vehicle lighter than that specified has been found by experience to lack the sturdiness required and a vehicle of heavier weight increases the operation cost without rendering proportionately greater service.

Certificate on weight, wheelbase and model upon which bid is submitted will be required.

CERTIFICATE.

We propose to furnish (make)_____(model)_____(type)_____ with a wheelbase of_____inches and certify that the weight of the car, without bumpers, without extra wheel or rim, without extra tire and tube, without kit of tools, without gasoline in tank or water in radiator, covered by this specification, is_____pounds, and that the shipping weight of the car including all accessories called for, is _____pounds.

Number of cars_____can be loaded in a freight car of_____feet _____inches.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 113
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a medium weight (3,100 pound) car.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C-Service Requirements and cover the type of car which by experience has shown will satisfactorily meet the requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described, having a wheelbase of not less than 115 inches. A shorter wheelbase will not be acceptable as cars with a shorter wheelbase do not have the sturdy chassis construction required by these specifications.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5 Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the (five passenger, four door, closed type) (five passenger, two door, closed type) (two-three passenger coupe type) as indicated in the invitation to bid and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking devices.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack, and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

D-9. Weight Requirements.

The complete vehicle, less bumpers, tool kit, gasoline and water shall weigh (3,100 pounds if four-door type) (3,050 pounds if two-door type) (3,000 pounds if coupe type), as indicated in the invitation to bid. A deviation of not more than six (6%) per cent over or under the weight will be accepted. A vehicle lighter than that specified has been found by experience to lack the sturdiness required and a vehicle of heavier weight increases the operation cost without rendering proportionately greater service.

Certificate on weight, wheelbase and model upon which bid is submitted will be required.

CERTIFICATE.

We propose to furnish (make)_____(model)_____(type)_____ with a wheelbase of_____inches and certify that the weight of the car, without bumpers, without extra wheel or rim, without extra tire and tube, without kit of tools, without gasoline in tank or water in radiator, covered by this specification, is_____pounds, and that the shipping weight of the car including all accessories called for, is _____pounds.

Number of cars_____can be loaded in a freight car of_____feet _____inches.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 114
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a heavy type (3,500 lbs) car, when larger and roomier body is one of the essential re-requirements.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C- Service Requirements and cover the type of car which by experience has shown will satisfactorily meet these requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described, having a wheelbase of not less than 120 inches. A shorter wheelbase will not be acceptable as cars with a shorter wheelbase do not have the sturdy chassis construction required by these specifications.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the five passenger, four door, closed type and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking device.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube,mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

D-9. Weight Requirements.

The complete vehicle, less bumpers, tool kit, gasoline and water shall weigh 3,500 pounds. A deviation of not more than six (6%) per cent over or under the weight will be accepted. A vehicle lighter than that specified has been found by experience to lack the sturdiness required.

Certificate on weight, wheelbase and model upon which bid is submitted will be required.

CERTIFICATE.

We propose to furnish (make) _____(model)_____(type)_____ with a wheelbase of_____inches and certify that the weight of the car, without bumpers, without extra wheel or rim, without extra tire and tube, without kit of tools, without gasoline in tank or water in radiator, covered by this specification, is_____pounds, and that the shipping weight of the car including all accessories called for, is_____pounds.

Number of cars_____can be loated in freight car of_____feet _____inches.

UNITED STATES DEPARTMENT OF AGRICULTURE
Specification
for
Passenger-Carrying Motor Vehicles.

Spec. A - MVA - 114
October 27, 1938

C- Service Requirements.

Bureau to furnish service requirements to cover the needs of a heavy type (3,500 lbs) car, when larger and roomier body is one of the essential re-requirements.

D- Specifications.

In order to secure the widest range of competition from manufacturers of, and dealers in, motor vehicles of the type required, the following specifications are submitted. These specifications are based on several years experience in the operation of cars under the conditions described under C- Service Requirements and cover the type of car which by experience has shown will satisfactorily meet these requirements.

D-1. Chassis.

The chassis shall be of sturdy construction capable of withstanding the strains of the service described, having a wheelbase of not less than 120 inches. A shorter wheelbase will not be acceptable as cars with a shorter wheelbase do not have the sturdy chassis construction required by these specifications.

D-2. Power Unit.

The power unit must be of not less than six cylinders and of the internal combustion type, of such design and construction that the alternate power impulses give a continuous and uniform torque, resulting in an even flow of power at both maximum and minimum piston speed without undue vibration, strain or overheating of working parts, and shall be equipped with an efficient oil filter and oil bath type air cleaner.

D-3. Cooling System.

The cooling system shall be of the force-feed type, using a pump as a circulating agent. The radiator shall be of the standard production type and size with proper allowance in radiation area for cars delivered at points 5,000 feet in altitude and over as indicated in the proposal.

D-4. Transmission.

The transmission shall be so designed as to provide the optional use of at least three separate power ratios forward and one reverse at a constant engine speed, thus reducing excessive heating and wear of working parts and eliminating excessive engine speeds for the power required.

D-5. Brakes.

The brakes shall be of the four wheel type of such size and efficiency as to meet the requirements of the traffic code of the State in which the car is to be used.

D-6. Tires.

The tires delivered on the car shall bear serial numbers showing release by the tire manufacturers within six months prior to the delivery of the car and shall be of the (four ply) (six ply) balloon or air wheel type as indicated in the invitation to bid.

D-7. Body.

The body shall be of the five passenger, four door, closed type and shall be provided with a luggage carrying compartment or built-in trunk, with door opening from the rear, equipped with suitable locking device.

D-8. Equipment.

The equipment shall be that furnished the public generally but in all cases shall include the following, spare rim or wheel including extra tire and tube,mounted on suitable carrier and if carried outside of body to be protected with lock and key, shock absorbers, electric head, tail and dash lights, signal horn, speedometer, dual type automatic windshield wiper, non-glare rear vision mirror, full kit of tools, jack and bumpers front and rear with bumper guards, voltage regulator or other equally effective means of preventing overcharging of battery. All glass shall be of the shatter-proof type.

D-9. Weight Requirements.

The complete vehicle, less bumpers, tool kit, gasoline and water shall weigh 3,500 pounds. A deviation of not more than six (6%) per cent over or under the weight will be accepted. A vehicle lighter than that specified has been found by experience to lack the sturdiness required.

Certificate on weight, wheelbase and model upon which bid is submitted will be required.

CERTIFICATE.

We propose to furnish (make) _____(model)_____(type)_____ with a wheelbase of_____inches and certify that the weight of the car, without bumpers, without extra wheel or rim, without extra tire and tube, without kit of tools, without gasoline in tank or water in radiator, covered by this specification, is_____pounds, and that the shipping weight of the car including all accessories called for, is_____pounds.

Number of cars_____can be loated in freight car of_____feet _____inches.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D. C.

Technical Advisory Board.

January 26, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 5.

Subject: Standard Specifications Covering Windmills and Towers.

To Chiefs of Bureaus and Offices:

In conformity with the Secretary's memorandum of June 8, 1938, outlining its duties, the Technical Advisory Board has prepared standard specifications covering windmills and towers, for use by all Bureaus of the Department.

Two copies of the proposed specification No. A - FEW - 1001 are attached. Your comments and recommended changes, if any, are requested, to reach this office not later than February 26, 1939.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Proposed
Specifications
for
Windmills and Towers

Spec. A - FEW - 1001
January 26, 1939

C-SERVICE REQUIREMENTS.

C-1. The windmill called for by these specifications is to be used for pumping water where the weather conditions are likely to be severe. The mill and tower should be sturdily designed and constructed so that it will have long life, be rust resistant, not damaged by high winds with velocities up to a maximum of 80 miles per hour. Due to the fact that the windmill may be located in isolated places or cannot be frequently serviced, it shall be self-oiling and require attention in this respect only once every twelve months.

C-2. The windmill offered shall be new, of current model and a standard product, complete with all accessories as regularly furnished to the farm trade, except for such additions or omissions as may be called for in the specifications.

C-3. Parts found to be not of current or standard production or parts defective in material or workmanship shall be replaced free of charge at any time during the life of the unit by the manufacturer upon request by the Government.

D-SPECIFICATIONS.

The Government reserves the right to waive minor variations from these specifications in the equipment offered if it is to the best interests of the Government and meets the service requirements of the using service.

D-1. Windmills

D-1a. Windwheel.

The windwheel shall be of the self-oiling type with heavy duty durable gears. The oiling system must be such that it will thoroughly lubricate all bearings and working parts without attention except once in every twelve months. Adequate provision must be made for preventing loss of oil from the gear case. Complete instructions for operation and care must be supplied by the successful bidder.

D-1b. Size

The windwheels shall be classified according to size and weight as follows:

Class	Diam. in ft.	Approx. min. wt. in lbs.
A-6	6	275
A-8	8	350
A-10	10	500
A-12	12	800
A-14	14	1400
A-16	16	2300
A-18	18	2700

D-1c. Bearings.

Shall be self-oiling and either anti-friction or removable plain babbitt bearings or equal.

D-1d. Turntable.

Must be freely operating self-aligning and have self-oiling either plain or anti-friction bearings.

D-1e. Governor.

Must be automatic so that the mill will operate in high winds without damage.

D-1f. Brakes

Must be positive and of adequate construction to stop and hold the wheel without squealing, jerking or grabbing.

D-1g. Furling Device.

Must be easily operated and sufficiently sturdy to give long life and to control the mill at all times. A spring bumper is required to absorb the shock when the wheel is turned into the wind.

D-1h. Sails.

Must be constructed of heavy gage steel, well formed and securely fastened to hold their shape permanently and resist severe winds.

D-1i. Gear Covers.

Gear boxes or covers shall be of sturdy construction, weather and water proof. Due to the fact that the oil is changed only at long intervals it is essential that all working parts be kept as dust and water free as good design and construction will permit.

D-1j. Galvanizing.

All exposed areas shall be heavily galvanized or otherwise treated in an approved manner for permanent protection against rust and weather. Galvanizing must not be damaged by the manufacturer in assembly of the wheel.

D-2. Towers

D-2a. Type.

Shall be of the four post type of sufficiently sturdy design to carry the windwheel specified in all winds with velocities up to a maximum of 80 miles per hour. It shall be furnished complete with ladder securely fastened to tower; substantial platform properly located to permit ready access to motor for repairs and upkeep work; pump rod; long anchor posts and heavy anchor plates; and complete instructions for erection.

D-2b. Size

The tower shall be classified according to the following heights. spread at base, angle size and weights.

Class	Height	Spread at base min.	Angle size in inches min.	Approx. min. wt. in lbs.
B-20	20'	5'	2x2x1/8	375
B-30	30'	6'	2x2x1/8	500
B-40	40'	8'	$2\frac{1}{2}$x$2\frac{1}{2}$x1/8	700
B-50	50'	10'	$2\frac{1}{2}$x$2\frac{1}{2}$x3/16	1000
B-60	60'	12'	3x3x1/8	1400
B-80	80'	16'	3x3x3/16	2200

D-2c. Girts.

Shall be of angle steel of adequate cross section to give proper stability to the tower specified and spaced approximately 5 feet apart.

D-2d. Braces.

Tower shall be adequately braced to prevent twisting or deformation of the tower members. The braces shall be adjustable or capable of giving uniform tension at all times.

D-2e. Galvanizing

All parts shall be heavily galvanized or otherwise treated in an approved manner to resist rust and weather.

D-2f. Pump Rod Guides

Tower shall be equipped with sufficient pump rod guides to keep the pump rod in proper alignment without binding or interfering with the action of the rod.

D-3. Questionnaire:

Description and Illustration. "Bidder must submit with his bid description and illustration of the windmill offered. In addition complete answers shall be furnished for the following questions:

D-3a. Shipping weight_____lbs. (complete)

D-3b. Windwheel

1. Weight_____lbs
2. Diameter of wheel_____ft.
3. Number of sails_____thickness_____in.
4. Number of gears_____ _____type of gears_____
5. Type of bearings: shaft,_____turntable_____
6. Automatic Governor?_____
7. Brake, Type_____
8. Type oiling system. Self oiling?_____Do gears run in oil?_____Do bearings run in oil?_____
9. Gear covers, weather and waterproof?_____
10. Weather and rust resistance. Type of treatment_____
_____
Treatment before or after wheel assembly?_____
11. Furling device, spring shock absorber?_____
12. Adjustable stroke variations_____in._____in._____in.

D-3c. Tower.

1. Weight_____ _____lbs.
2. Number of posts_____
3. Size. Height_____ft. Spread at base_____ft.
Angle size_____
4. Girts, Type_____Size_____Spacing_____ft.
5. Braces. Type_____Adjustable?_____
6. Anchor posts. Length_____ft.
7. Anchor plates. Type_____length_____ft.
8. Pump rod. Type_____size_____
9. Pump rod guides. Type_____
10. Ladder. Type_____Location on tower_____
11. Platform. Size_____ _____
12. Weather and rust resistance. Type of treatment_____

D-3d. The windmill offered deviates from the specifications as follows:
_____
_____

D-3e. It is agreed that in the event exceptions are not listed under the above paragraph, the right is reserved to demand full and complete compliance with the specification requirements._____

UNITED STATES DEPARTMENT OF AGRICULTURE
Proposed
Specifications
for
Windmills and Towers

Spec. A - FEW - 1001
January 26, 1939

C-SERVICE REQUIREMENTS.

C-1. The windmill called for by these specifications is to be used for pumping water where the weather conditions are likely to be severe. The mill and tower should be sturdily designed and constructed so that it will have long life, be rust resistant, not damaged by high winds with velocities up to a maximum of 80 miles per hour. Due to the fact that the windmill may be located in isolated places or cannot be frequently serviced, it shall be self-oiling and require attention in this respect only once every twelve months.

C-2. The windmill offered shall be new, of current model and a standard product, complete with all accessories as regularly furnished to the farm trade, except for such additions or omissions as may be called for in the specifications.

C-3. Parts found to be not of current or standard production or parts defective in material or workmanship shall be replaced free of charge at any time during the life of the unit by the manufacturer upon request by the Government.

D-SPECIFICATIONS.

The Government reserves the right to waive minor variations from these specifications in the equipment offered if it is to the best interests of the Government and meets the service requirements of the using service.

D-1. Windmills

D-1a. Windwheel.

The windwheel shall be of the self-oiling type with heavy duty durable gears. The oiling system must be such that it will thoroughly lubricate all bearings and working parts without attention except once in every twelve months. Adequate provision must be made for preventing loss of oil from the gear case. Complete instructions for operation and care must be supplied by the successful bidder.

D-1b. Size

The windwheels shall be classified according to size and weight as follows:

Class	Diam. in ft.	Approx. min. wt. in lbs.
A-6	6	275
A-8	8	350
A-10	10	500
A-12	12	800
A-14	14	1400
A-16	16	2300
A-18	18	2700

D-1c. Bearings.

Shall be self-oiling and either anti-friction or removable plain babbitt bearings or equal.

D-1d. Turntable.

Must be freely operating self-aligning and have self-oiling either plain or anti-friction bearings.

D-1e. Governor.

Must be automatic so that the mill will operate in high winds without damage.

D-1f. Brakes

Must be positive and of adequate construction to stop and hold the wheel without squealing, jerking or grabbing.

D-1g. Furling Device.

Must be easily operated and sufficiently sturdy to give long life and to control the mill at all times. A spring bumper is required to absorb the shock when the wheel is turned into the wind.

D-1h. Sails.

Must be constructed of heavy gage steel, well formed and securely fastened to hold their shape permanently and resist severe winds.

D-1i. Gear Covers.

Gear boxes or covers shall be of sturdy construction, weather and water proof. Due to the fact that the oil is changed only at long intervals it is essential that all working parts be kept as dust and water free as good design and construction will permit.

D-1j. Galvanizing.

All exposed areas shall be heavily galvanized or otherwise treated in an approved manner for permanent protection against rust and weather. Galvanizing must not be damaged by the manufacturer in assembly of the wheel.

D-2. Towers

D-2a. Type.

Shall be of the four post type of sufficiently sturdy design to carry the windwheel specified in all winds with velocities up to a maximum of 80 miles per hour. It shall be furnished complete with ladder securely fastened to tower; substantial platform properly located to permit ready access to motor for repairs and upkeep work; pump rod; long anchor posts and heavy anchor plates; and complete instructions for erection.

D-2b. Size

The tower shall be classified according to the following heights. spread at base, angle size and weights.

Class	Height	Spread at base min.	Angle size in inches min.	Approx. min. wt. in lbs.
B-20	20'	5'	2x2x1/8	375
B-30	30'	6'	2x2x1/8	500
B-40	40'	8'	$2\frac{1}{2}$x$2\frac{1}{2}$x1/8	700
B-50	50'	10'	$2\frac{1}{2}$x$2\frac{1}{2}$x3/16.	1000
B-60	60'	12'	3x3x1/8	1400
B-80	80'	16'	3x3x3/16	2200

D-2c. Girts.

Shall be of angle steel of adequate cross section to give proper stability to the tower specified and spaced approximately 5 feet apart.

D-2d. Braces.

Tower shall be adequately braced to prevent twisting or deformation of the tower members. The braces shall be adjustable or capable of giving uniform tension at all times.

D-2e. Galvanizing

All parts shall be heavily galvanized or otherwise treated in an approved manner to resist rust and weather.

D-2f. Pump Rod Guides

Tower shall be equipped with sufficient pump rod guides to keep the pump rod in proper alignment without binding or interfering with the action of the rod.

D-3. Questionnaire:

Description and Illustration. "Bidder must submit with his bid description and illustration of the windmill offered. In addition complete answers shall be furnished for the following questions:

D-3a. Shipping weight_____lbs. (complete)

D-3b. Windwheel

1. Weight_____lbs
2. Diameter of wheel_____ft.
3. Number of sails_____thickness_____in.
4. Number of gears_____ _____type of gears_____
5. Type of bearings: shaft,_____turntable_____
6. Automatic Governor?_____
7. Brake, Type_____
8. Type oiling system. Self oiling?_____Do gears run in oil?_____Do bearings run in oil?_____
9. Gear covers, weather and waterproof?_____
10. Weather and rust resistance. Type of treatment_____
_____
Treatment before or after wheel assembly?_____
11. Furling device, spring shock absorber?_____
12. Adjustable stroke variations_____in._____in._____in.

D-3c. Tower.

1. Weight_____lbs.
2. Number of posts_____
3. Size. Height_____ft. Spread at base_____ft.
Angle size_____
4. Girts, Type_____Size_____Spacing_____ft.
5. Braces. Type_____Adjustable?_____
6. Anchor posts. Length_____ft.
7. Anchor plates. Type_____length_____ft.
8. Pump rod. Type_____size_____
9. Pump rod guides. Type_____
10. Ladder. Type_____Location on tower_____
11. Platform. Size_____ _____
12. Weather and rust resistance. Type of treatment_____

D-3d. The windmill offered deviates from the specifications as follows:
_____
_____

D-3e. It is agreed that in the event exceptions are not listed under the above paragraph, the right is reserved to demand full and complete compliance with the specification requirements._____

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF BUDGET AND FINANCE
WASHINGTON, D.C.

Technical Advisory Board

January 31, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 6.

Subject: Standard Specifications Covering Track Type Tractors.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum of June 8, 1938, defining the duties of the Technical Advisory Board, a general specification has been prepared covering track type tractors in all catagories proposed for use throughout the Department.

This specification is tentatively designated No. A.- TT - G0 -601 two copies of which are attached.

Your comments and criticisms are invited and it is requested that your replies be forwarded to this office not later than March 15, 1939.

OTTO ENGELMANN

(Enclosures)

Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Specifications
for
Track Type Tractors.

A - TT - GO - 601
January 31, 1939.

C- SERVICE REQUIREMENTS.

Bureau to supply a brief and concise statement substantiating the need for the particular type and size of apparatus specified. Statement shall indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d) Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special features, attachments and accessories.

D- SPECIFICATIONS.

It is the intent of this specification to describe a crawler track type tractor of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with tractors of this type and class whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards weight, dimensions, and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate in an amount not exceeding 5% less than any single requirement specified provided that the unit is, in other particulars, substantially in accordance with the specifications and that such deviation does not reduce its capacity, diminish its structural strength and ruggedness or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Size and Capacity.

The tractor shall fulfill the requirements for drawbar horsepower, weight, and drawbar pull, of the classification specified in the invitation to bid.

D-1a. Tractors Gasoline Powered.

Class - G	D. B. H. P.	D. B. Pull Min.	Weight
G-22	22	3750#	5000#
G-24	24	5000#	6000#
G-35	35	7000#	8000#
G-45	45	9000#	10,500#
G-60	60	10,500#	12,500#
G-75	75	19,000#	21,000#

D-1b. Tractors Oil Fuel Powered

Class - O	D. B. H. P.	D. B. Pull Min.	Weight
O-25	25	5500#	6500#
O-30	30	7000#	8500#
O-45	45	9000#	11,000#
O-60	60	14,000#	18,000#
O-90	90	22,000#	27,500#

D-1c. The tractors furnished shall be capable of delivering not less than the horsepower specified, measured at the drawbar in low gear in accordance with test procedure currently accepted in the industry. The horsepower may be determined from "Nebraska Test" reports, at the Aberdeen Proving Ground or other tests equally acceptable to the purchaser.

D-1d. The weight specified shall be the actual weight of a standard unit in operating condition with standard equipment, exclusiv of water, fuel, operator, and any other attachments not an integral part of the manufacturer's standard production unit.

D-1e. The tractors furnished shall be capable of delivering not less than the drawbar pull in pounds specified when operating in low gear, measured in accordance with test procedure currently accepted as standard in the industry. The drawbar pull may be determined from the "Nebraska Tests" reports, at the Aberdeen Proving Ground or other test equally acceptable to the purchaser.

D-2. Power Plants.

D-2a. The power units furnished with Class G, Gasoline Powered Tractors, shall be the current production model internal combustion engine using gasoline as a fuel. It shall be a four stroke cycle engine particularly adapted for this service complete with all necessary operating accessories, capable of operating indefinitely under full load without overheating when supplied with "G" grade fuel Federal Specification VV-G-101a. Engines shall be capable of adjustment to operate efficiently when high grade fuels are supplied.

D-2b. The power unit furnished with Class O, Oil Fuel Powered Tractors shall be the current production model four stroke cycle internal combustion engine capable of operating on commercial distillates meeting Navy Specifications 702 - C. The engine shall be equipped with an adequate solid fuel injection mechanism, ignition of the charge being accomplished either electrically or by compression. The engine shall be furnished complete with all necessary operating accessories enabling it to operate indefinitely under full load at governed speed without overheating.

D-3. Tractor engines shall be equipped with appropriate starting apparatus capable of starting the engines under the most adverse operating conditions, when specified in the bid proposal.

D-4. The tractor transmission shall provide not less than three speeds forward and one in reverse.

D-5. The gear ratios in the several travel speeds shall be the manufacturer's lowest standard production unless otherwise specified.

D-6. Drive and steering clutches shall be the manufacturer's standard production models.

D-7. The track frame shall be designed to withstand the stress of ordinary operation and in addition provide adequate support for attaching any devices with which the tractor may be used in combination.

D-8. The track assembly shall be made up of heat treated and hardened steel so as to provide the maximum resistance to wear and abrasion. Track shoes shall be the cleat type of the manufacturer's standard size unless otherwise specified.

D-9. The tractor shall be the manufacturer's minimum standard gage unless otherwise specified.

D-10. Standard production front bumper shall be furnished when specified.

D-11. Front pull hooks shall be furnished when specified.

D-12. When specified in the invitation to bid, the tractor shall be equipped with a sturdy radiator guard designed to provide the maximum protection to the radiator from damage when exposed to the hazards ordinarily encountered in the work indicated under the service requirements. The guard shall be constructed so as to offer the least impairment to the efficiency of the cooling system compatible with the required ruggedness.

D-13. When specified in the invitation to bid, the tractor shall be equipped with substantial crankcase guard capable of affording positive protection to the crankcase, flywheel housing, accessories, and any other assemblies exposed to damage from projecting stumps, brush, boulders, and other obstructions likely to be encountered when operating in rough terrain. The guard shall be capable of withstanding the full weight of the tractor

without destruction, while providing complete protection to any vulnerable assembly, when bearing upon one or more projecting objects. Adequate provisions shall be made for access, through the guard, to any points requiring periodic service.

D-14. When specified in the invitation to bid, the tractor shall be equipped with two automotive type headlights and one swivel mounted rear flood light of not less than 32 C. P. each, complete with generator, storage battery of ample capacity and all necessary operating connections and accessories. All wiring and connections shall be enclosed in weatherproof non-metallic loom.

D-15. The tractor engine shall be equipped with an efficient oil filter of the replaceable cartridge type or the equivalent.

D-16. The ractor engine shall be equipped with an efficient air cleaner of the oil bath type or the equivalent.

D-17. When specified in the invitation to bid, the engine exhaust shall be equipped with an efficient spark arrestor.

D-18. When specified in the invitation to bid, the tractor shall be equipped with a device to continuously indicate the vicosity of the crankcase oil. The indicator shall be mounted in a position visible to the operator and shall be furnished complete with all necessary operating accessories and connections.

D-19. When specified in the invitation to bid, the tractor shall be equipped with standard production cab enclosing the operator's seat and all operating controls. It shall be weather tight and interpose the minimum obstruction to vision under all operating conditions.

D-20. The tractor shall be equipped with a complement of tools and appliances of recognized quality sufficient to accomplish all periodic lubrication, field adjustments, emergency repairs, and ordinary preventive maintenance, together with a substantial tool box and ample capacity , all suitably mounted and furnished with a lock and two keys.

D-21. All surfaces exposed to the weather, other than corrosion resistant polished metal surfaces or trim, shall be suitably primed, under coated and finish painted in such color, if other than standard, as may be designated by the purchaser.

D-22. Standard departmental insignia, identification or marking devices shall be installed when specified.

E- TESTS.

E-1. When standard production units are furnished under this specification no tests will be required except in the absence of certified test reports by an accredited testing agency as indicated in paragraphs D-1c, D-1d and D-1e. When necessary to ascertain compliance under paragraphs D-1a or D-1b, only such tests shall be prescribed as conform to the standard test code of the recognized engineering authority in the industry.

F- QUESTIONNAIRE.

Bids must be accompanied by the following questionnaire fully completed by the bidder.

F-1. Make of tractor?_____ Model?_____

F-2. Weight of Standard unit? (See par. D-1a)_____

F-3. Shipping weight?_____

F-4. Number of units per standard freight car?_____

F-5. D.B.H.P.?_____ How determined?_____

F-6. D. B. Pull?_____ How determined?_____

F-7. Motor make?_____ Model?_____ Fuel?_____

F-8. Transmission type?_____ Number of speeds?_____

F-9. Speeds M.P.H. 1st?_____ 2nd?_____ 3rd?_____
4th?_____ 5th?_____ 6th?_____

F-10. Starter, kind?_____

F-11. Oil filter, make?_____ Type or model?_____

F-12. Air cleaner, make?_____ Type or model?_____

F-13. Spark arrester, make?_____ Type or model?_____

F-14. Tractors we propose to furnish under this invitation to bid deviate from this specification requirements in the following particulars:

_____ _____

_____

_____

F-15. It is agreed that in the event exceptions are not listed or filed under par. F-14 above, the right is reserved to demand full and complete compliance with the specification requirements.

Signature_____

Title_____ _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Specifications
for
Track Type Tractors.

A - TT - GO - 601
January 31, 1939.

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_____

_____

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Signature_____

Title_____

Clear file

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS
WASHINGTON, D. C.

Technical Advisory Board

March 3, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 7.

Subject: Motor Transport Service.

To Chiefs of Bureaus and Offices:

Pursuant to paragraphs two and six of the Secretary's memorandum, No. 809, the Technical Advisory Board is undertaking a study of the Department's Garage and Motor Transport System for the District of Columbia. In order to secure data relating to the conduct and efficiency of the shop, the Board would appreciate receiving the benefit of your experience in connection with the character of service rendered, costs, etc., and any other comments you would care to make. Information is solicited particularly with reference to the following:

1. Comments, favorable or unfavorable, with reference to service, gasoline, oil, greasing and minor adjustments.

2. Comments with reference to major repairs and rehabilitation. Cite recent specific cases with all facts, costs, dates, etc.

3. Number of units and approximate frequency of service to vehicles now patronizing the shop.

4. Probable work load if shop facilities were modernized so as to offer service equivalent to modern commercial facilities.

5. Any recommendation you care to make with reference to the present automotive service and repair facilities.

A reply to this memorandum by March 15, will be appreciated.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS
WASHINGTON, D. C.

Technical Advisory Board

March 16, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 8.

Subject: Standard Specifications Covering Six Wheel Four Rear Wheel Drive Transport Truck.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum of June 8, 1939, defining the duties of the Technical Advisory Board, a specification has been prepared covering a six wheel, four rear wheel drive transport truck for use throughout the Department.

This specification is tentatively designated No. A-MVT-162, two copies of which are attached. It is proposed to issue in the near future two additional specifications for this type of truck, one covering 16,000 pounds gross payload and the other covering 28,000 pounds gross payload.

Your comments and criticisms are invited and it is requested that your replies be forwarded to this office not later than April 10, 1939.

OTTO ENGELMANN

(Enclosures) Chairman, Technical Advisory Board.

A-MVT-162
March 10, 1939
Covering Fed. Spec.
KKK-T-706

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Heavy Duty Transport Truck
6 wheel - 4 wheel rear drive.

C. Service Requirements.

The vehicle covered by this advertisement is to be used by the _____ _____under severely unfavorable operating conditions not generally encountered in commercial service. It will be operated over steep grades, poor roads, over rocky terrain and sometimes under conditions where no roads exist. The truck will be required to carry heavy, concentrated loads consisting of tractors and other type of heavy machinery between projects and repair shops. Therefore, the vehicle must have a heavy duty chassis, sturdily built to withstand rough usage, with ample power to negotiate the aforementioned condition and grades, etc. without overheating. Design and construction to be such as to withstand the strains imposed while operating under aforementioned conditions, without evidence of overload on any of the units incorporated in the construction of the chassis.

D. Specifications.

D-1. Chassis.

D-1a. The chassis shall be of sturdy construction and capable of withstanding the service as described under "Service Requirements." It shall have a net load carrying capacity of 20,500 pounds consisting of cab, body, winch, all accessories required herein, and pay load; a gross vehicle weight, including pay load, cab, body winch, all accessories, and chassis as established by the bidder and a minimum dry chassis weight of not less than 11,000 pounds complete (less fuel, motor lubricant, water, brush guard, front bumpers, shock absorbers, spare tire, rim and wheel assembly, cab, tools, winch, jacks, body and pay load). The weight distribution with evenly distributed load over body 16 feet long, shall provide approximately 20% of the total gross weight on the front tires. "Weighing" of the vehicle, in any part or group of parts to meet the requirements of the minimum dry chassis weight will not be permitted.

D-1b. The wheelbase measured from center line of the front wheels to the center line between the two rear wheels shall be approximately 190 inches.

D-2. Frame. The chassis frame shall be strongly braced and of such design and construction as to adequately support the gross weight of body, load power plant and other necessary equipment. The main frame members shall be designed and built to carry the load specified without the use of fish plates.

D-3. Power Units. The power unit shall consist of a heavy truck engine, clutch and transmission, embodied in a unit power plant or the units may be mounted separately.

D-4. Engine. The engine shall be of the internal combustion, four stroke cycle type, having not less than six cylinders, gasoline operated. It shall have a piston displacement of not less than 450 cubic inches developing with accessories; i.e., with fan, generator, oil cleaner and muffler, not less than 310 lbs. ft. of torque at all speeds between 700 and 1,200 r.p.m. and a maximum torque including distributor and water pump of not less than 320 lbs. ft. using gasoline having a knock rating of not more than 68 octane number. Manufacturer shall submit with his bid certified engine curve of engine he proposes to furnish, determined in accordance with S.A.E. procedure. A viscosity instrument shall be installed and connected to oil pressure line on the engine. The crankshaft shall be statically and dynamically balanced and supported by not less than seven (7) main bearings.

D-5. Cooling. The cooling system shall, at outside air temperatures between sixty (60) and one hundred twelve (112) degrees Fahrenheit, under standard conditions of pressure, maintain a differential in temperature between the radiator outlet water temperature and outside air temperature, of not to exceed one hundred (100) degrees Fahrenheit, this under the most severe operating conditions. The cooling system shall be thermostatically controlled. The radiator shall be so mounted that it will not be damaged by frame distortion resulting from cross country operation.

D-6. Lubricating System. The engine lubrication system shall provide full force feed lubrication to at least the crankshaft, main and connecting rod lower bearings, and adequate lubrication shall be provided to the piston pin and camshaft bearings, cylinder walls and timing gears or chain. The pump shall be positively driven, of the self-priming type and located in the crankcase. The lubricating system shall function satisfactorily when the vehicle is standing on side slopes, right or left, up to twenty (20) degrees, and on longitudinal slopes, up and down, to thirty five (35) degrees. The oil reservoir capacity shall be sufficient to permit the vehicle when loaded at its rated pay load capacity to proceed a distance of not less than one hundred and fifty (150) miles on good roads over average rolling to hilly terrain, without requiring replenishment of the oil supply. An oil reservoir tank of one (1) gallon capacity shall be provided and connected to the oil reservoir to permit replenishment when necessary. An oil cleaner or filter shall be provided of a type that will prevent excessive contamination of the crankcase oil. The oil filter provided shall be recommended by the engine manufacturer and guaranteed to maintain the engine lubricant in suitable condition without replacement of the original filling, except to add the quantity normally consumed by the engine, for not less than two thousand (2000) miles of vehicle operation. When it is the engine manufacturer's practice to conduct the oil under pressure from the oil pump directly to and through the oil filter to the lubricating distribution system, the relief valve shall be so located in the system as to by-pass the lubricant around the filter in the event the filter becomes clogged. Connection of the filter in the oil lines shall be in a location that will insure an adequate supply of oil under the proper pressure to all bearings and frictional surfaces. Flexible oil lines, impervious to oil, shall be provided from the engine to the oil pressure guage, and to the oil filter, if the filter is not mounted on the engine.

The chassis lubricating system shall be of the high pressure type with fittings suitably located to provide lubrication to all wearing parts in accordance with best commercial practice. The fittings must be of a design that will permit the ready attachment of the high pressure grease gun connection.

D-7. Ignition System. The engine shall be equipped with a complete battery and generator ignition system of six (6) volt potential, having automatic or hand control for spark advance. The system shall be complete with all accessories.

D-8. Fuel System. The fuel system shall consist of one or two tanks of not less than fifty-nine (59) gallon total capacity, the fuel tank or tanks to contain suitable baffles and to be so mounted that the tanks and mounting will not be damaged by frame distortion and be adequately protected from injury from rocks resulting from cross-country operations; a mechanical fuel pump, including strainers, sediment bowl and all necessary accessories; and an air cleaner of the oil bath type, having sufficient oil capacity and volume to deposit two (2) pounds of dirt and maintain an efficiency of at least ninety-seven (97) per cent. The fuel system shall function satisfactorily on side slopes, right and left, up to twenty (20) degrees, and on longitudinal slopes, up and down, to thirty-five (35) degrees. A flexible fuel line shall be provided from the fuel line on the frame to the fuel pump; in addition, flexible lines shall be provided at every point where vibration might cause tubing failure, and shall be impervious to gasoline. When two fuel tanks are provided, a two-way valve shall be located at a convenient point in the driver's compartment and arranged to permit fuel being drawn from either tank with the fuel line to the other tank effectively sealed. The valve shall be fuel-tight and so mounted that it is protected from damage. The gasoline filler pipe must be located outside the cab.

D-9. Muffler. A substantial leak-proof exhaust system, amply proportioned and securely mounted at a height to prevent damage shall be provided. The tail pipe shall discharge into the slip stream at the rear tire in such a manner as to effectively preclude the entrance of fumes into the cab.

D-10. Clutch. The torque capacity of the clutch shall be at least ten (10) per cent in excess of the engine maximum torque. The clutch throw-out and throw-out shaft bearing shall be provided with suitable means for lubrication.

D-11. Transmission. The transmission shall be of the selective constant mesh or sliding gear type. The gears shall be machine cut from high-grade alloy steel, heat treated and ground, and constant mesh gears shall be ground or lapped. It shall be* of sturdy construction and the input torque capacity shall be ten (10) per cent in excess of the maximum torque developed by the engine. It shall be of such design as to provide not less than five (5) speeds forward direct in fifth and one (1 speed reverse, properly proportioned to permit ease in shifting.

*at least.

D-12. Transfer Case. Items 12, 12a, 12b, 12c - Federal Specifications KKK-T-706 do not apply.

D-13. Propeller Shafts. Propeller shaft and universal joints shall be of rugged construction, positively lubricated and possess high angle operating characteristics. The torque capacity shall be at least equal to the maximum torque developed by the engine through the lowest intervening gear reductions.

D-14. Axles. Front and rear axles to be of sturdy construction and capable of sustaining the total gross load at the ground without evidence of overload, providing no attempt has been made to arbitrarily raise the rating over the manufacturer's previously published ratings for heavy duty service. The rear axles shall be of the tandem type, full floating, spiral bevel or double reduction, power divider two shaft or through drive, equipped with an interaxle differential. This differential shall be provided with a locking device controlled manually from the cab or a device which automatically supplies a larger proportion of the torque to the non-spinning wheels. The diameter of the axle shaft shall be not less than two and one-eighth (2 1/8) inches at the spline. The torque capacity shall be at least equal to the engine maximum torque through the lowest gear reduction provided. The overall gear reduction shall be not less than fifty (50) to one (1). The rear axle shall have a nominal tread approximately equal to the front axle tread. (Nominal tread is distance between centers of dual pairs of tires on the same axle).

D-15. Springs. Springs shall be of adequate strength to sustain the gross weight without evidence of overload or permanent set. They shall be designed to take drive torque and braking forces except when other provisions are made to take such forces.

D-16. Shock Absorbers. Shall be furnished on front.

D-17. Bogie. Applies. Bogie design shall permit a difference in vertical movement between any of the four (4) rear wheels mounting an obstacle ten (10) inches in height, the balance of the wheels remaining in contact with the ground, traction being maintained, and without undue distortion of the suspension mechanism, the bogie units and the chassis frame. Lateral float shall not exceed one quarter (1/4) inch on an axle.

D-18. Wheels and Tires.

D-18a. Wheels are to be standard production and providing for single front and dual rear tires.

D-18b. The truck shall be equipped with 9.00 x 20, 10 ply, tires and heavy duty tubes, front and rear interchangeable, of the "Truck-Bus Balloon Type", and shall conform to current Federal Specifications.

D-18c. One spare rim or wheel shall be mounted safely and conveniently and protected by lock and key, and so located that there is no interference with full opening of any door and no interference with the safe operation of the truck.

D-19. Brakes.

D-19a. The truck shall be provided with a braking system that will safely control the fully loaded vehicle at all times under all operating conditions.

D-19b. Service Brakes. The service brakes shall be of the air application type. Brake drums shall be provided on front wheels and on inner rear wheels. Means shall be provided to readily adjust the brakes to compensate for wear. Lining shall be not less than three-quarter (3/4) inch thick on rear wheels and not less than three-eighth (3/8) inch on front wheels. Adequate slack adjusters are required on all wheels. The braking system shall be capable of controlling and holding the fully loaded vehicle on a thirty (30) per cent grade and be capable of consistently bringing the fully loaded vehicle to a complete stop at a rate of deceleration equivalent to a stop within twenty-five (25) feet from a speed of twenty (20) miles per hour, on dry, hard, approximately level road, free from loose material. An air compressor shall be provided of not less than seven and one-quarter (7.25) cubic feet per minute capacity at twelve hundred (1200) r.p.m., water-cooled and continuously lubricated from the engine oiling system. Total reservoir capacity on the truck shall be not less than two thousand (2000) cubic inches. Brake diaphragms shall be located above the center line and to the front of the rear axle housing and in the rear of the front axle to prevent their being damaged; their location shall provide clearance with every part of the vehicle under all conditions of operation. The system shall include unloading device, no air alarm, guage, water separator and the necessary quick release valves, etc., and a tire inflation hose of thirty (30) feet with tire air valve check and fitting for connection to dash air supply valve. All air lines and units to be mounted in a neat substantial manner and lines shall be protected when necessary by non-metallic loom. Air pressure guage lights showing both reservoir and brake line pressure required.

D-19c. Parking Brakes. The parking brake or brakes shall be hand lever operated, either entirely separate from the service brake or be mechanically connected to the same brake shoe through entirely separate mechanical mechanism. When the parking brake is applied to the propeller shaft, it shall be so located that it shall always be effective on driving wheels. The system shall be capable of controlling and holding the fully equipped and loaded vehicle while traveling on a thirty (30) per cent grade, and bring it to a complete stop within fifty (50) feet from a speed of twenty (20) miles per hour on a dry, hard, approximately level road, free from loose material; without requiring frequent adjustment.

D-20. Electrical Equipment. The truck shall be provided with complete electric starting, lighting and ignition system. There shall be installed at least the following lighting devices and reflectors.

A. On the front; two head lamps, one at each side; two amber clearance lamps, one at each side.

B. On each side; one amber side marker lamp, located at or near front; one red side marker lamp, located at or near the rear; one amber reflector located at or near the front; one red reflector, located at or near the rear.

C. On the rear; one red tail lamp; one read or amber stop light; two rear clearance lamps, one at each side; two red reflectors, one on each side.

All in conformity and mounted in accordance with ICC Safety Regulations.

The battery shall conform to current Federal Specifications of not less than one hundred seventy (170) ampere hours at a twenty (20) hour rate. The starting motor and generator shall be of adequate capacity and substantially mounted. The current output of the generator, at all speeds above that at which the generator develops sufficient current to carry the load, shall be ample to supply the ignition and all lights on the chassis without assistance from the battery. The generator shall include an integral ventilating fan.

D-21. Chassis Equipment. The chassis shall be equipped with heavy duty front bumper, front fenders, heavy duty grill. The tool equipment shall consist of one (1) adjustable end wrench ten (10) inch, two (2) double end open end wrenches (#27 & 29), one (1) eight (8) inch screwdriver, one (1) six inch (6) combination pliers, one (1) grease gun of nine (9) ounce capacity, one-pound (1) ball pein hammer with standard hickory handle, one five eighths (5/8) by six (6) inch cold chisel, one (1) water pump packing gland wrench, one (1) wheel nut wrench and one (1) hydraulic jack of five (5) ton capacity. The accessory equipment shall be complete including at least, rear view mirror mounted in such a position inside the driver's compartment as to permit observation to the rear of the vehicle through the rear window, and rear view mirror mounted in such a position outside the cab as to permit full observation, by the operator of the roadway and vehicles approaching from the rear, dual windshield wiper of the vacuum or electrically operated type, locks and keys for cab door and tire carrier and electric horn mounted in a protected position. The instrument or panel board shall be arranged in such a manner that all indicating and recording instruments are adequately illuminated and of the flush type, and shall include; indicating speedometer and recording odometer, fuel guage, ammeter, engine heat indicator, oil pressure and oil viscosity indicating guage, ignition lock and hand throttle control. All lamps shall be fitted with standard SAE mountings. They shall be thoroughly sealed against moisture and dirt, and the reflectors shall be best quality, silver plated with mirror finish.

D-22. Controlling Mechanism. The chassis shall be equipped with an efficient steering mechanism, of ample size, rigid and sturdy column, easy of operation, located on left side and must permit convenient adjustment for lost motion.

D-23. Operating Mechanism. All operating devices shall be within easy and convenient reach of the operator.

D-24. Name and Caution Plates. The truck shall be provided with a name and caution plate, mounted conspicuously near the driver.

D-25. Body and Cab.

A. Body - to be heavy duty stake type and shall be one hundred ninety-two (192) inches long by ninety-six (96) inches wide by forty-two (42) inches high. The following specifications are minimum acceptable finished dimensions and necessary to withstand hauling tractors and other heavy equipment.
The lowest possible body platform height is required. Trucks will be used for hauling tractors that will develop heavy loads concentrated in the center and extreme sides of the body platform, cross sills must be of sufficient strength to withstand this concentration.
Longitudinal sills to be not less than two and one-fourth (2-1/4) inches by seven and three-fourths (7-3/4) inches.
There shall be at least seven (7) cross sills spaced approximately two (2) feet apart.
Floor to be not less than one and seven-eighths (1-7/8) inches thick placed longitudinally and screwed to each cross member with at least two screws per cross member.
Steel wearing strips not less than three-sixteenths (3/16) inch by two (2) inches shall be installed over each floor joint and are to be screwed to the floor.
Screw heads to be counter sunk.
Slats not less than one and one-sixteenths (1-1/16) inches thick.
Backs not less than forty-two (42) inches high.
Front panel solid, not less than one and one-sixteenths (1-1/16) inches thick, arranged so as not to interfere with vision through rear window of the cab and permanently installed.
Side racks, three sections of one and one-sixteenths (1-1/16) inches thick.
Stake pockets to be mounted so as not to protrude outside of body side rails, and shall be securely riveted or welded in place.
Stakes to be not less than two and one-fourth (2-1/4) inches by three (3) inches metal bound within the stake pocket and shall fit the stake pocket snugly.
All sides of the platform to be bound with one-forth inch (1/4) by two (2) inch strap iron.

B. Cab - Shall be of coupe type, fully enclosed and with ventilating windshield. Ventilators in sides or cowl of cab directing air in also required. Safety glass must be supplied throughout, windshield to be plate grade. Left door shall be provided with internal lock. Right door to be provided with external key type lock and drop windows operated by crank handle in doors. The window of the rear of the cab shall be covered with a rust proof removable screen, wires not less than one-eighth (1/8) inch in diameter, and one-half (1/2) inch in mesh.
Cushions and back shall be well padded over resilient spring assembly and covered by good grade of imitation leather or they may be of the Airfoam (Latex) rubber type. The back cushion shall be in one piece, full depth and fit snugly down against seat section. To insure the required regidity the cab shall be of pressed steel construction, or a combination of pressed rolled steel and wood and no joints at corners or other points of heavy stress will be permitted. Cabs of such design and construction as will permit loosening at joints by repeated longitudinal and/or transverse loads resulting from road shocks are not acceptable. Operating conditions require a maximum amount of resistance

to such loads or shocks. A type of cab that offers the maximum in continuity of section and resists strains as a unit rather than by individual members is required.

D-26. Special Operating Equipment

(a.) The truck shall be provided with heavy duty front tow hooks, rigidly fastened to the frame, and heavy duty rear pintle hook.

(b.) Skid rail with jacks similar to that used on power line construction trucks shall be securely mounted at the rear end of the frame so that top of skid rail will be flush with the floor of the body.

(c). Four oak skids, twelve (12) feet long by twelve (12) inches wide by four (4) inches thick complete with hooks are required.

(d). A twenty thousand (20,000) pound pull, heavy duty power winch with single niggerhead mounted in the forward end of the body securely fastened to the frame required. Winch to be reversable, single forward speed with clutch and brake controls. Cable to be not less than three-fourths (3/4) inch diameter, one hundred fifty (150) feet in length and be supplied with heavy duty hook. Shall be furnished complete with heavy duty transmission power take-off.

D-27. Painting As specified

E. Test Requirements

None required.

F- Questionnaire

No bids will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

F-1. Chassis: Make _____
Model _____

F-1a. Allowable gross weight _____ lbs.

F-1b. Stripped chassis weight _____ lbs.
(Complying with Par. D-1. Dry Chassis)

F-1c. Weight distribution on tires at the ground
Loaded, Front Wheels _____ lbs.
Loaded, Bogie _____ lbs.
Unloaded, Front Wheels _____ lbs.
Unloaded, Bogie _____ lbs.

F-1d. Manufacturer's allowance for body, cab, winch, fuel, oil, water, tools and driver _____ lbs.

F-1e. Net capacity available for payload after deducting the sum of (b) and (d) from (a)_____lbs.

F-1f. Wheelbase_____inches

F-1i. Distance from rear of cab to center of tandem axle_____inches.

F-1j. Distance from rear of cab to rear of frame_____inches.

F-1m. Actual overall length_____inches.
Actual Shipping weight_____lbs.

F-2. Engine, make_____
model_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____

F-2d. Maximum torque, gross_____pounds feet.
(Using fuel with octane rating of not more than 68 and without accessories but including distributor and water pump.)

Maximum torque net_____pounds feet.
(Using fuel with octane rating of not more than 68 and with all accessories, i.e. fan, generator, oil cleaner and muffler over range from 700 to 1200 r.p.m.)

F-2e. Number of main bearings_____

F-2h. Type of oil clarifier_____Type of air cleaner_____

F-3. Clutch. Make_____
Model_____
Type_____
Capable of transmitting a torque of_____pounds feet.

F-4. Transmission: Make_____
Model_____

F-4a. Maximum input torque capacity_____pounds feet.

F-4b. Number of forward speeds_____

F-4c. Gear ratio: First_____; second_____; third_____
fourth_____; fifth_____; Reverse_____

F-6. Front axle: Make_____
Model_____

F-6a. Maximum allowable load on tires at ground:
Under normal operating conditions_____lbs
Under severe operating conditions_____lbs.
(Off the road Class "C" service)

F-8. Rear axle. Make_____ Manufactured by_____
Model_____ Type_____

F-8a. Maximum allowable load on tires at ground_____ lbs.

F-8b. Gear ratio_____

F-8c. Axle shaft diameter_____ At splien_____

F-8d. Maximum input torque capacity,_____ lbs. ft.

F-9. Bogie. Make_____ Model_____ Type_____
Wheelbase_____

F-9a. Maximum allowable load on tires at ground_____ lbs.

F-10. Service brakes. Make_____ Type_____

F-10a. Number_____ Diameter(Front_____ Rear_____)
Width (Front_____ Rear_____) Braking area:
(Front_____ Rear_____)

F-10b. Air brake reservoir capacity_____ cu.in.

F-11. Parking brake. Make_____ Type_____

F-12. Tires. Make_____

F-12c. Dual tire spacing_____ Rim size_____
Loaded radius_____

F-13. Steering gear. Make_____ Model_____

F-14. Turning circle. Diameter to center of outside wheel_____

F-16. Gasoline tank. Location_____ Capacity_____

F-17. Lighting and starting. Make_____ Type_____

F-18. Battery. Make_____ Voltage_____
Capacity_____ ampere hours at 20 hour rate.

F-19. Cab. Make_____ Type_____ Weight_____

F-20. Body. Make_____ Model_____

F-20a. Weight_____ pounds.

F-20b. Length_____ Width_____ Height_____.

F-23. Location of service facilities. A complete stock of spare parts for the truck bid on is carried at the following points_____

A-MVT-169
March 10, 1939
Covering Fed. Spec.
KKK-T-706

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Heavy Duty Transport Truck
6 wheel - 4 wheel rear drive.

C. Service Requirements.

The vehicle covered by this advertisement is to be used by the _____ _____ under severely unfavorable operating conditions not generally encountered in commercial service. It will be operated over steep grades, poor roads, over rocky terrain and sometimes under conditions where no roads exist. The truck will be required to carry heavy, concentrated loads consisting of tractors and other type of heavy machinery between projects and repair shops. Therefore, the vehicle must have a heavy duty chassis, sturdily built to withstand rough usage, with ample power to negotiate the aforementioned condition and grades, etc. without overheating. Design and construction to be such as to withstand the strains imposed while operating under aforementioned conditions, without evidence of overload on any of the units incorporated in the construction of the chassis.

D. Specifications.

D-1. Chassis.

D-1a. The chassis shall be of sturdy construction and capable of withstanding the service as described under "Service Requirements." It shall have a net load carrying capacity of 20,500 pounds consisting of cab, body, winch, all accessories required herein, and pay load; a gross vehicle weight, including pay load, cab, body winch, all accessories, and chassis as established by the bidder and a minimum dry chassis weight of not less than 11,000 pounds complete (less fuel, motor lubricant, water, brush guard, front bumpers, shock absorbers, spare tire, rim and wheel assembly, cab, tools, winch, jacks, body and pay load). The weight distribution with evenly distributed load over body 16 feet long, shall provide approximately 20% of the total gross weight on the front tires. "Weighing" of the vehicle, in any part or group of parts to meet the requirements of the minimum dry chassis weight will not be permitted.

D-1b. The wheelbase measured from center line of the front wheels to the center line between the two rear wheels shall be approximately 190 inches.

D-2. Frame. The chassis frame shall be strongly braced and of such design and construction as to adequately support the gross weight of body, load power plant and other necessary equipment. The main frame members shall be designed and built to carry the load specified without the use of fish plates.

D-3. Power Units. The power unit shall consist of a heavy truck engine, clutch and transmission, embodied in a unit power plant or the units may be mounted separately.

D-4. Engine. The engine shall be of the internal combustion, four stroke cycle type, having not less than six cylinders, gasoline operated. It shall have a piston displacement of not less than 450 cubic inches developing with accessories; i.e., with fan, generator, oil cleaner and muffler, not less than 310 lbs. ft. of torque at all speeds between 700 and 1,200 r.p.m. and a maximum torque including distributor and water pump of not less than 320 lbs. ft. using gasoline having a knock rating of not more than 68 octane number. Manufacturer shall submit with his bid certified engine curve of engine he proposes to furnish, determined in accordance with S.A.E. procedure. A viscosity instrument shall be installed and connected to oil pressure line on the engine. The crankshaft shall be statically and dynamically balanced and supported by not less than seven (7) main bearings.

D-5. Cooling. The cooling system shall, at outside air temperatures between sixty (60) and one hundred twelve (112) degrees Fahrenheit, under standard conditions of pressure, maintain a differential in temperature between the radiator outlet water temperature and outside air temperature, of not to exceed one hundred (100) degrees Fahrenheit, this under the most severe operating conditions. The cooling system shall be thermostatically controlled. The radiator shall be so mounted that it will not be damaged by frame distortion resulting from cross country operation.

D-6. Lubricating System. The engine lubrication system shall provide full force feed lubrication to at least the crankshaft, main and connecting rod lower bearings, and adequate lubrication shall be provided to the piston pin and camshaft bearings, cylinder walls and timing gears or chain. The pump shall be positively driven, of the self-priming type and located in the crankcase. The lubricating system shall function satisfactorily when the vehicle is standing on side slopes, right or left, up to twenty (20) degrees, and on longitudinal slopes, up and down, to thirty five (35) degrees. The oil reservoir capacity shall be sufficient to permit the vehicle when loaded at its rated pay load capacity to proceed a distance of not less than one hundred and fifty (150) miles on good roads over average rolling to hilly terrain, without requiring replenishment of the oil supply. An oil reservoir tank of one (1) gallon capacity shall be provided and connected to the oil reservoir to permit replenishment when necessary. An oil cleaner or filter shall be provided of a type that will prevent excessive contamination of the crankcase oil. The oil filter provided shall be recommended by the engine manufacturer and guaranteed to maintain the engine lubricant in suitable condition without replacement of the original filling, except to add the quantity normally consumed by the engine, for not less than two thousand (2000) miles of vehicle operation. When it is the engine manufacturer's practice to conduct the oil under pressure from the oil pump directly to and through the oil filter to the lubricating distribution system, the relief valve shall be so located in the system as to by-pass the lubricant around the filter in the event the filter becomes clogged. Connection of the filter in the oil lines shall be in a location that will insure an adequate supply of oil under the proper pressure to all bearings and frictional surfaces. Flexible oil lines, impervious to oil, shall be provided from the engine to the oil pressure guage, and to the oil filter, if the filter is not mounted on the engine.

The chassis lubricating system shall be of the high pressure type with fittings suitably located to provide lubrication to all wearing parts in accordance with best commercial practice. The fittings must be of a design that will permit the ready attachment of the high pressure grease gun connection.

D-7. Ignition System. The engine shall be equipped with a complete battery and generator ignition system of six (6) volt potential, having automatic or hand control for spark advance. The system shall be complete with all accessories.

D-8. Fuel System. The fuel system shall consist of one or two tanks of not less than fifty-nine (59) gallon total capacity, the fuel tank or tanks to contain suitable baffles and to be so mounted that the tanks and mounting will not be damaged by frame distortion and be adequately protected from injury from rocks resulting from cross-country operations; a mechanical fuel pump, including strainers, sediment bowl and all necessary accessories; and an air cleaner of the oil bath type, having sufficient oil capacity and volume to deposit two (2) pounds of dirt and maintain an efficiency of at least ninety-seven (97) per cent. The fuel system shall function satisfactorily on side slopes, right and left, up to twenty (20) degrees, and on longitudinal slopes, up and down, to thirty-five (35) degrees. A flexible fuel line shall be provided from the fuel line on the frame to the fuel pump; in addition, flexible lines shall be provided at every point where vibration might cause tubing failure, and shall be impervious to gasoline. When two fuel tanks are provided, a two-way valve shall be located at a convenient point in the driver's compartment and arranged to permit fuel being drawn from either tank with the fuel line to the other tank effectively sealed. The valve shall be fuel-tight and so mounted that it is protected from damage. The gasoline filler pipe must be located outside the cab.

D-9. Muffler. A substantial leak-proof exhaust system, amply proportioned and securely mounted at a height to prevent damage shall be provided. The tail pipe shall discharge into the slip stream at the rear tire in such a manner as to effectively preclude the entrance of fumes into the cab.

D-10. Clutch. The torque capacity of the clutch shall be at least ten (10) per cent in excess of the engine maximum torque. The clutch throw-out and throw-out shaft bearing shall be provided with suitable means for lubrication.

D-11. Transmission. The transmission shall be of the selective constant mesh or sliding gear type. The gears shall be machine cut from high-grade alloy steel, heat treated and ground, and constant mesh gears shall be ground or lapped. It shall be* of sturdy construction and the input torque capacity shall be ten (10) per cent in excess of the maximum torque developed by the engine. It shall be of such design as to provide not less than five (5) speeds forward direct in fifth and one (1) speed reverse, properly proportioned to permit ease in shifting.

*at least.

D-12. Transfer Case. Items 12, 12a, 12b, 12c - Federal Specifications KKK-T-706 do not apply.

D-13. Propeller Shafts. Propeller shaft and universal joints shall be of rugged construction, positively lubricated and possess high angle operating characteristics. The torque capacity shall be at least equal to the maximum torque developed by the engine through the lowest intervening gear reductions.

D-14. Axles. Front and rear axles to be of sturdy construction and capable of sustaining the total gross load at the ground without evidence of overload, providing no attempt has been made to arbitrarily raise the rating over the manufacturer's previously published ratings for heavy duty service. The rear axles shall be of the tandem type, full floating, spiral bevel or double reduction, power divider two shaft or through drive, equipped with an interaxle differential. This differential shall be provided with a locking device controlled manually from the cab or a device which automatically supplies a larger proportion of the torque to the non-spinning wheels. The diameter of the axle shaft shall be not less than two and one-eighth (2 1/8) inches at the spline. The torque capacity shall be at least equal to the engine maximum torque through the lowest gear reduction provided. The overall gear reduction shall be not less than fifty (50) to one (1). The rear axle shall have a nominal tread approximately equal to the front axle tread. (Nominal tread is distance between centers of dual pairs of tires on the same axle).

D-15. Springs. Springs shall be of adequate strength to sustain the gross weight without evidence of overload or permanent set. They shall be designed to take drive torque and braking forces except when other provisions are made to take such forces.

D-16. Shock Absorbers. Shall be furnished on front.

D-17. Bogie. Applies. Bogie design shall permit a difference in vertical movement between any of the four (4) rear wheels mounting an obstacle ten (10) inches in height, the balance of the wheels remaining in contact with the ground, traction being maintained, and without undue distortion of the suspension mechanism, the bogie units and the chassis frame. Lateral float shall not exceed one quarter (1/4) inch on an axle.

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All in conformity and mounted in accordance with ICC Safety Regulations.

The battery shall conform to current Federal Specifications of not less than one hundred seventy (170) ampere hours at a twenty (20) hour rate. The starting motor and generator shall be of adequate capacity and substantially mounted. The current output of the generator, at all speeds above that at which the generator develops sufficient current to carry the load, shall be ample to supply the ignition and all lights on the chassis without assistance from the battery. The generator shall include an integral ventilating fan.

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There shall be at least seven (7) cross sills spaced approximately two (2) feet apart.
Floor to be not less than one and seven-eighths (1-7/8) inches thick placed longitudinally and screwed to each cross member with at least two screws per cross member.
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Screw heads to be counter sunk.
Slats not less than one and one-sixteenths (1-1/16) inches thick.
Backs not less than forty-two (42) inches high.
Front panel solid, not less than one and one-sixteenths (1-1/16) inches thick, arranged so as not to interfere with vision through rear window of the cab and permanently installed.
Side racks, three sections of one and one-sixteenths (1-1/16) inches thick.
Stake pockets to be mounted so as not to protrude outside of body side rails, and shall be securely riveted or welded in place.
Stakes to be not less than two and one-fourth (2-1/4) inches by three (3) inches metal bound within the stake pocket and shall fit the stake pocket snugly.
All sides of the platform to be bound with one-forth inch (1/4) by two (2) inch strap iron.

B. Cab - Shall be of coupe type, fully enclosed and with ventilating windshield. Ventilators in sides or cowl of cab directing air in also required. Safety glass must be supplied throughout, windshield to be plate grade. Left door shall be provided with internal lock. Right door to be provided with external key type lock and drop windows operated by crank handle in doors. The window of the rear of the cab shall be covered with a rust proof removable screen, wires not less than one-eighth (1/8) inch in diameter, and one-half (1/2) inch in mesh.
Cushions and back shall be well padded over resilient spring assembly and covered by good grade of imitation leather or they may be of the Airfoam (Latex) rubber type. The back cushion shall be in one piece, full depth and fit snugly down against seat section. To insure the required regidity the cab shall be of pressed steel construction, or a combination of pressed rolled steel and wood and no joints at corners or other points of heavy stress will be permitted. Cabs of such design and construction as will permit loosening at joints by repeated longitudinal and/or transverse loads resulting from road shocks are not acceptable. Operating conditions require a maximum amount of resistance

to such loads or shocks. A type of cab that offers the maximum in continuity of section and resists strains as a unit rather than by individual members is required.

D-26. Special Operating Equipment

(a.) The truck shall be provided with heavy duty front tow hooks, rigidly fastened to the frame, and heavy duty rear pintle hook.

(b.) Skid rail with jacks similar to that used on power line construction trucks shall be securely mounted at the rear end of the frame so that top of skid rail will be flush with the floor of the body.

(c). Four oak skids, twelve (12) feet long by twelve (12) inches wide by four (4) inches thick complete with hooks are required.

(d). A twenty thousand (20,000) pound pull, heavy duty power winch with single niggerhead mounted in the forward end of the body securely fastened to the frame required. Winch to be reversable, single forward speed with clutch and brake controls. Cable to be not less than three-fourths (3/4) inch diameter, one hundred fifty (150) feet in length and be supplied with heavy duty hook. Shall be furnished complete with heavy duty transmission power take-off.

D-27. Painting As specified.

E. Test Requirements

None required.

F- Questionnaire

No bids will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

F-1. Chassis: Make _____
Model _____

F-1a. Allowable gross weight _____ lbs.

F-1b. Stripped chassis weight _____ lbs.
(Complying with Par. D-1. Dry Chassis)

F-1c. Weight distribution on tires at the ground
Loaded, Front Wheels _____ lbs.
Loaded, Bogie _____ lbs.
Unloaded, Front Wheels _____ lbs.
Unloaded, Bogie _____ lbs.

F-1d. Manufacturer's allowance for body, cab, winch, fuel, oil, water, tools and driver _____ lbs.

F-1e. Net capacity available for payload after deducting the sum of (b) and (d) from (a)_____lbs.

F-1f. Wheelbase_____inches

F-1i. Distance from rear of cab to center of tandem axle_____inches.

F-1j. Distance from rear of cab to rear of frame_____inches.

F-1m. Actual overall length_____inches.
Actual Shipping weight_____lbs.

F-2. Engine, make_____
model_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____

F-2d. Maximum torque, gross_____pounds feet.
(Using fuel with octane rating of not more than 68 and without accessories but including distributor and water pump.)

Maximum torque net_____pounds feet.
(Using fuel with octane rating of not more than 68 and with all accessories, i.e. fan, generator, oil cleaner and muffler over range from 700 to 1200 r.p.m.)

F-2e. Number of main bearings_____

F-2h. Type of oil clarifier_____Type of air cleaner_____

F-3. Clutch. Make_____
Model_____
Type_____
Capable of transmitting a torque of_____pounds feet.

F-4. Transmission: Make_____
Model_____

F-4a. Maximum input torque capacity_____pounds feet.

F-4b. Number of forward speeds_____

F-4c. Gear ratio: First_____; second_____; third_____
fourth_____; fifth_____; Reverse_____

F-6. Front axle: Make_____
Model_____

F-6a. Maximum allowable load on tires at ground:
Under normal operating conditions_____lbs
Under severe operating conditions_____lbs.
(Off the road Class "C" service)

F-8. Rear axle. Make_____ Manufactured by_____
Model_____ Type_____

F-8a. Maximum allowable load on tires at ground_____ lbs.

F-8b. Gear ratio_____

F-8c. Axle shaft diameter_____ At splien_____

F-8d. Maximum input torque capacity,_____ lbs. ft.

F-9. Bogie. Make_____ Model_____ Type_____
Wheelbase_____

F-9a. Maximum allowable load on tires at ground_____ lbs.

F-10. Service brakes. Make_____ Type_____

F-10a. Number_____ Diameter(Front_____ Rear_____)
Width (Front_____ Rear_____) Braking area:
(Front_____ Rear_____)

F-10b. Air brake reservoir capacity_____ cu.in.

F-11. Parking brake. Make_____ Type_____

F-12. Tires. Make_____

F-12c. Dual tire spacing_____ Rim size_____
Loaded radius_____

F-13. Steering gear. Make_____ Model_____

F-14. Turning circle. Diameter to center of outside wheel_____

F-16. Gasoline tank. Location_____ Capacity_____

F-17. Lighting and starting. Make_____ Type_____

F-18. Battery. Make_____ Voltage_____
Capacity_____ ampere hours at 20 hour rate.

F-19. Cab. Make_____ Type_____ Weight_____

F-20. Body. Make_____ Model_____

F-20a. Weight_____ pounds.

F-20b. Length_____ Width_____ Height_____.

F-23. Location of service facilities. A complete stock of spare parts for the truck bid on is carried at the following points_____
_____

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS.
WASHINGTON, D. C.

Technical Advisory Board. March 18, 1939.

TECHNICAL ADVISORY BOARD CIRCULAR NO. 9.

Subject: Standard Specifications Covering Farm Type Tractor.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum of June 8, 1939, defining the duties of the Technical Advisory Board, a general specification has been prepared covering rubber-tired wheel type farm tractor proposed for use throughout the Department.

This specification is tentatively designated No. A-FWT-R-651, two copies of which are attached.

Your comments and criticisms are invited and it is requested that your replies be forwarded to this office not later than April 10, 1939.

OTTO ENGELMANN

(Enclosures) Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE

Tentative Specifications
for
Farm Type Tractor

A-FWT-R-651
March 16, 1939

C. SERVICE REQUIREMENTS.

Bureau to supply a brief and concise statement substantiating the need for the particular type and size of apparatus specified. Statement shall indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d). Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special features, attachments and accessories.
(g) Turning radius to be specified.

D- SPECIFICATIONS.

It is the intent of this specification to describe a wheel type tractor of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with tractors of this type and class whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards weight, dimensions, and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offer in response to this invitation which may deviate in an amount not exceeding 5% less than any single requirement specified provided that the unit is, in other particulars, substantially in accordance with the specifications and that such deviation does not reduce its capacity, diminish its structural strength and ruggedness or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in it class.

D-1. Size and Capacity.

The tractor shall fulfill the requirements for drawbar horsepower; drawba pull; belt horsepower; weight, tire size, and turning radius of the classification specified in the invitation to bid.

D-1a. Tractors Rubber Tired.

Class R	Minimum Requirements									
					Rear Tires		Front Tires			
	D.B.H.P.	Drawbar Pull Lbs.	Belt Horsepower	Weight Lbs.	Size	Ply	Number of Wheels	Size	Ply	Turning Radius Maximum.
R-12	12	1300	16	2100	9.00 x 24	6	1 2	7.50 x 10 5.00 x 15	6 4	8'
R-15	15	1600	22	2800	9.00 x 36	6	1 2	7.50 x 10 5.50 x 16	6 4	8'
R-18	18	1800	24	3500	9.00 x 36	6	2	6.00 x 20	4	9'
R-23	23	2400	28	4200	10.00 x 40	6	2	6.00 x 20	4	9'
R-28	28	3000	32	5000	12.75 x 28	6	2	6.00 x 20	6	12'

D-1b. The tractors furnished shall be capable of delivering not less than the horsepower specified, measured at the drawbar in second gear and on the belt in a stationary position in accordance with test procedure currently accepted in the industry. The horsepower may be determined from the "Nebraska Test" reports, at the Aberdeen Proving Ground or other tests equally acceptable to the Department.

D-1c. The weight specified shall be the actual weight of a standard unit in operating condition with standard equipment, exclusive of water, fuel, operator, wheel weights, and any other attachments not an integral part of the manufacturer's standard production unit.

D-1d. The tractor furnished shall be capable of delivering not less than the drawbar pull in pounds specified when operating in second gear measured in accordance with test procedure currently accepted as standard in the industry. The drawbar pull may be determined from the "Nebraska Test" reports, at the Aberdeen Proving Ground or other test equally acceptable to the Department.

D-1e. The tires furnished shall be the manufacturer's standard Agriculture type low pressure pneumatic tires unless otherwise speciried.

The tire pressures to be in accordance with and the tire loading not to exceed the current recommendation of the Tire and Rim Association for the tires furnished. Tires to be equipped with connections for filling with water.

D-1f. The turning radius is to be considered as the outside turning radius with the narrowest wheel tread.

D-2. Power Plants.

The power units furnished with Class R, Gasoline Powered Tractors, shall be the current production model internal combustion engine using gasoline as a fuel unless otherwise specified. It shall be a four stroke cycle engine particularly adapted for this service complete with all necessary operating accessories, capable of operating indefinitely under full load without overheating when supplied with "G" grade fuel Federal Specification VV-G-101a. Engines shall be capable of adjustment to operate efficiently when kerosene and distillate fuels are supplied.

D-3. The tractor engines shall be equipped with appropriate starting apparatus capable of starting the engines under the most adverse operating conditions, when specified in the bid proposal.

D-4. The tractor transmission shall be of the selective type and provide not less than three speeds forward and one in reverse. Low shall be not less than two (2) miles per hour and high not less than five (5) miles per hour.

D-5. The tractor engine shall be equipped with an efficient oil filter of the replaceable cartridge type or the equivalent.

D-6. The tractor engine shall be equipped with an efficient air cleaner of the oil bath type or the equivalent.

D-7. The water cooling system shall be augmented by fan and equipped with thermostat or curtain for radiator with water temperature indicator for operation in all weather conditions or other satisfactory means of temperature control.

D-8. Engines shall be equipped with positive driven governor with provision for changing engine speed without impairing sensitivity.

D-9. Engine shall be equipped with high tension magneto with impulse coupling.

D-10. Fuel line shall be equipped with a fuel sediment trap.

D-11. When specified in the bid the engine shall be equipped with an efficient spark arrester.

D-12. When specified in the invitation to bid, the tractor shall be equipeed with a device to continuously indicate the viscosity of the crankcase oil. The indicator shall be mounted in a position visible to the operator and shall be furnished complete with all necessary operating accessories and connections.

D-13. The type and number of wheels with the variations in wheel treads to be specified according to service requirements.

D-14. Wheel weights of the type ordinarily furnished to the farm trade shall be furnished when specified, and shall be supplied with the necessary bolts or other means of fastening to the wheels.

D-15. The row clearance under the rear axle to be not less than 22 inches for row crop cultivation unless otherwise specified.

D-16. The tractor shall be provided with differential brakes of ample size for stopping and holding tractor under all conditions and for holding either rear wheel stationary for making 180° turns on the rear wheel as pivot. A foot brake shall be supplied for use in road travel.

D-17. The tractor shall be equipped with the regular drawbar hitch with lateral and vertical adjustments.

D-18. The tractor is to come equipped with standard belt pulley conveniently located for operation when the tractor is standing still unless otherwise specified.

D-19. Tractor to be equipped with rear power take-off connection preferably in conformity with A.S.A.E. Power Take-Off Standards.

D-20. Tractor to be equipped with power lift for raising or lowering attached implements when specified.

D-21. Tractor to be equipped with manufacturer's standard rear fenders when specified.

D-22. The tractor shall be equipped with a complement of tools and appliances of recognized quality sufficient to accomplish all periodic lubrication, field adjustments, emergency repairs, and ordinary preventive maintenance together with a substantial tool box of ample capacity, all suitably mounted and furnished with a lock and two keys.

D-23. All surfaces exposed to the weather, other than corrosion resistant polished metal surfaces or trim, shall be suitably primed, under coated and finish painted in such color, if other than standard, as may be designated by the Department.

D-24. Standard Departmental insignia, identification or marking devices shall be installed when specified.

E- TESTS.

E-1. When standard production units are furnished under this specification, no tests will be required except in the absence of certified test reports by an accredited testing agency as indicated in paragraphs D-1b, D-1d and D-1e. When necessary to ascertain compliance under paragraphs D-1a or D-1b, only such tests shall be prescribed as conform to the standard test code of the recognized engineering authority in the industry.

F- QUESTIONNAIRE.

Bids must be accompanied by the following questionnaire fully completed by the bidder.

F-1. Make of tractor?_____ Model?_____

F-2. Weight of Standard unit?(See Par. D-1a)_____

F-3. Shipping weight?_____

F-4. Number of units per standard freight car?_____

F-5. D.B.H.P?_____ How Determined?_____

F-6. D.B. Pull?_____ How determined?_____

F-7. Belt H. P.?_____ How determined?_____

F-8. Motor Make?_____ Model?_____ Fuel?_____

F-9. Transmission type?_____ Number of speeds?_____

F-10. Speeds M.P.H. 1st?_____ 2nd?_____ 3rd?_____
4th?_____ 5th?_____ 6th?_____

F-11. Starter, kind?_____

F-12. Oil filter, make?_____ Type or model?_____

F-13. Air cleaner, Make?_____ Type or model?_____

F-14. Spark arrester, make?_____ Type or model?_____

F-15. Turning radius?_____ ft.

F-16. Wheels, number?_____ Front diameter?_____
Rear diameter?_____

F-17. Tires, size front?_____ Size rear?_____

F-18. Tread, front?_____ in. Rear_____ to_____ in.

F-19. Belt pulley, R.P.M._____ Diameter_____ Face_____

F-20. Power take-off R.P.M.?_____ Nominal diameter?_____

F-21. Power lift, type?_____

F-22. Governor, type?_____

F-23. Tractors we propose to furnish under this invitation to bid deviate from the specification requirements in the following particulars:

_____

_____

_____

F-24. It is agreed that in the event exceptions are not listed or filed under par. F-23 above, the right is reserved to demand full and complete compliance with the specifications requirements.

Signature_____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE

Tentative Specifications
for
Farm Type Tractor

A-FWT-R-651
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D-5. The tractor engine shall be equipped with an efficient oil filter of the replaceable cartridge type or the equivalent.

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D-16. The tractor shall be provided with differential brakes of ample size for stopping and holding tractor under all conditions and for holding either rear wheel stationary for making 180° turns on the rear wheel as pivot. A foot brake shall be supplied for use in road travel.

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D-23. All surfaces exposed to the weather, other than corrosion resistant polished metal surfaces or trim, shall be suitably primed, under coated and finish painted in such color, if other than standard, as may be designated by the Department.

D-24. Standard Departmental insignia, identification or marking devices shall be installed when specified.

E- TESTS.

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F-3. Shipping weight?_____

F-4. Number of units per standard freight car?_____

F-5. D.B.H.P?_____ How Determined?_____

F-6. D.B. Pull?_____ How determined?_____

F-7. Belt H. P.?_____ How determined?_____

F-8. Motor Make?_____ Model?_____ Fuel?_____

F-9. Transmission type?_____ Number of speeds?_____

F-10. Speeds M.P.H. 1st?_____ 2nd?_____ 3rd?_____
4th?_____ 5th?_____ 6th?_____

F-11. Starter, kind?_____

F-12. Oil filter, make?_____ Type or model?_____

F-13. Air cleaner, Make?_____ Type or model?_____

F-14. Spark arrester, make?_____ Type or model?_____

F-15. Turning radius?_____ ft.

F-16. Wheels, number?_____ Front diameter?_____
Rear diameter?_____

F-17. Tires, size front?_____ Size rear?_____

F-18. Tread, front?_____ in. Rear_____ to_____ in.

F-19. Belt pulley, R.P.M._____ Diameter_____ Face_____

F-20. Power take-off R.P.M.?_____ Nominal diameter?_____

F-21. Power lift, type?_____

F-22. Governor, type?_____

F-23. Tractors we propose to furnish under this invitation to bid deviate from the specification requirements in the following particulars:

_____

_____

_____

F-24. It is agreed that in the event exceptions are not listed or filed under par. F-23 above, the right is reserved to demand full and complete compliance with the specifications requirements.

Signature_____

Title_____

F-1c. G.V.W. complying with these specifications_____ __lbs.

F-1d. Weight distribution: Gross weight on tires, front_____ rear_____.

F-1e. Wheelbase_____inches

F-1f. Distance from rear of cab to rear of frame_____inches

F-1g. Frame, maximum depth_____; flange width at critical point_____ _____material thickness_____

F-1h. Elastic limit_____per square inch.

F-2. Engine, Make_____Model_____

F-2a. Number of cylinders_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____at_____R.P.M.

F-2d. Maximum torque, net_____pound feet.

F-3. Clutch, Make_____Model_____
Torque capacity_____pound feet.

F-4. Transmission. Make_____Model_____

F-4a. Gear ratio: First_____; second_____; third_____; fourth or high_____

F-5. Front axle. Maximum allowable load on tires at ground_____lbs

F-6. Rear axle. Maximum allowable load on tires at ground_____lbs
Gear ratio_____.

F-7. Service brakes. Braking area_____

F-8. Tires. Size_____ply_____

F-9. Turning circle. Diameter to outside wheel_____

F-10. Body, Make_____Model_____

of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout, windshield to be plate grade.

Color: Specify color required.

E. Test Requirements - None

F- Questionnaire. No bid will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

To be Used with Dumps.

F-1. Chassis - Make_____ Model_____
F-1a. Dry chassis weight stripped_____lbs.
F-1b. Straight commercial G.V.W. Rating_____lbs.
F-1c. G.V.W. Complying with these specifications_____lbs.
F-1d. Weight distribution: Gross weight on tires front_____
rear_____
F-1e. Wheelbase_____inches.
F-1f. Distance from rear of cab to rear of frame_____inches.
F-1g. Frame, maximum depth_____; flange width at critical point
_____; material thickness_____.
F-1h. Elastic limit_____per square inch.
F-2. Engine, Make_____ Model_____
F-2a. Number of cylinders_____
F-2b. Cubic inch piston displacement_____
F-2c. Maximum brake horsepower_____at_____R.P.M.
F-2d. Maximum torque, net_____pound feet.
F-3. Clutch. Make_____ Model_____
Torque capacity_____pound feet.
F-4. Transmission. Make_____ Model_____
F-4a. Gear ratio: First_____; Second_____
Third_____; fourth or high_____
F-5. Front Axle. Maximum allowable load on tires at ground_____lbs.
F-6. Rear axle. Maximum allowable load on tires at ground_____lbs.
Gear ratio_____.
F-7. Service brakes. Braking area_____
F-8. Tires. Size_____ply_____
F-9. Turning circle. Diameter to outside wheel_____
F-10. Body, Make_____ Model_____
Hoist (if required) Make_____ Model_____

To be Used with Stakes.

F-1. Chassis. Make_____ Model_____
F-1a. Dry chassis weight stripped_____lbs_____
F-1b. Straight commercial G.V.W. rating_____lbs.

D-15. Brakes. The truck shall be provided with an adequate braking system that will safely control the fully equipped and loaded truck at all times, under all operating conditions. Service brake shall be of the four wheel type, capable of bringing the fully equipped and loaded truck to a complete stop at a rate of deceleration equivalent to a stop within twenty-five (25) feet from a speed of twenty (20) miles per hour on a dry hard, approximately level road, free from loose materials. There shall be no evidence of excessive fading. Parking brake shall be the manufacturers standard production capable of controlling and holding the fully equipped and loaded vehicle while traveling on a thirty (30) per cent grade.

D-16. Electrical Equipment. Federal Specification KKK-T-701a applies. Battery of not less than 94 ampere hours at a 20 hour rate. The lighting equipment and permanently installed safety, lighting and reflector devices shall be the manufacturers' standard, provided that the equipment shall be complete, conforming to I.C.C. Safety Regulations.

D-17. Chassis Equipment. The truck shall be equipped with all standard accessories including but not restricted to the following: Electric signal horn; two automatic windshield wipers; rear vision mirror giving unobstructed rear view; ignition lock; tire pump; kit of tools; 3-ton capacity jack; grease gun; spare tire lock; front fenders and running boards; instrument panel with speedometer, ammeter, oil guage, heat indicator and electric gasoline guage. Voltage regulator or other suitable arrangement to prevent overcharging of battery must be furnished. Tail light and license bracket shall be installed at rear of truck in such manner as to protect these parts from damage. Viscosity instrument may be specified.

D-18. Controlling Mechanism. Federal Specification KKK-T-701a applies.

D-19. Body and Cab.

(a) Stake: The body to be standard production stake body with loading space approximately 144" long, 84" wide, stakes approximately 38" high. Cabs shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The windows of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout; windshield to be plate grade.

(b). Dumps: The body to be 1½ yard all steel dump body with double acting tail gate and supporting chains. Body to be 8 guage and supplied with side braces and rub rails. Stake pockets to be furnished on front and sides of body. Body shall be not more than 8 feet long.
Hoist: To be underbody hydraulic type and be complete with power take-off and with controlls located within the cab.
Cab: The cab shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The window of the

D-5. Cooling System. The cooling system shall be of the force feed type, using a pump as a circulating agent, and must be of such design and efficiency as to keep the engine at an economical operating temperature under all operating conditions. A heavy duty radiator, of the largest size, offered commercially for the particular truck bid on to meet the service conditions described, is required.

D-6. Lubricating System. Standard production acceptable. An efficient oil filter to be provided.

D-7. Ignition System. Federal Specification KKK-T-701a applies.

D-8. Fuel System. Standard production acceptable, except that tank filler pipes must be located outside the cab.

D-9. Clutch. Federal Specification KKK-T-701a applies. The torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine.

D-10. Transmission. Federal Specification KKK-T-701a applies. The input torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine. Not less than four (4) speeds forward and one speed reverse.

D-11. Axles. Federal Specification KKK-T-701a applies. Rear axle to be of the bevel gear driven type. The gear ratio shall be the lowest standard production furnished the commercial trade by the manufacturer. The input torque capacity of the axle furnished shall be at least equal to the maximum (gross) torque of the engine as developed through the lowest gear reduction provided in the transmission assembly. The front wheel cramping angle shall be such as to enable the truck to negotiate sharp curves readily.

D-12. Springs. Federal Specification KKK-T-701a applies. To be equipped with auxiliary or overload springs.

D-13. Shock Absorbers. Shock absorbers to be furnished front and rear on stake trucks and front only on dumps.

D-14 Wheels and Tires. Wheels shall be of the manufacturers' standard production. Dual wheels shall be provided on the rear axle. Tires shall be of the heavy duty truck and buss balloon type size 7.00 x 20, 8 ply. All wheels, or rims, tires and tubes respectively, shall be interchangeable. Dual wheel spacing and surrounding clearances shall be sufficient to permit installation and satisfactory use of tire chains. Each truck shall be provided with one spare wheel or rim without tire and tube mounted so as not to interfere with use of door or restrict side or ground clearance. No mounting required for dump trucks.

A-MVT- 125
April 6, 1939
Covering Fed. Spec.
KKK-T-701a

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Heavy Duty
Maximum 4500 pound payload
Dump and Stake Trucks.

A. Applicable Federal and other specifications.

B. General

C. Service Requirements.

The conditions under which these trucks are to be operated are to be fully described by the Bureau requiring this type of truck. The specification is to be employed only when heavy duty service is involved and when such service is approximately 60% off-the-road; i.e., Class "C" Service.

D. Specifications.

D-1. Chassis. The Chassis shall be of sturdy construction, capable of withstanding the strains of the service as described under "Service Requirements." It shall have a minimum dry chassis weight of thirty-two hundred and fifty (3250) pounds, including the chassis complete (less fuell, motor lubricant, water, brush guard when specified, front bumper, spare tire, wheel and rim assembly, cab, tools, equipment, body, hoist when specified, and payload); and shall have a payload carrying capacity of not less than four thousand (4000) pounds under off-the-road service and as stated under Service Requirements, and shall have a payload carrying capacity of four thousand five hundred (4500) pounds under normal operating conditions, including the operating personnel. The latter loading condition will prevail for 40% of its operating time. The maximum gross weight shall be consistent with the load requirements and shall include the weight of the chassis complete, cab, body complete, including hoist when specified, fuel, lubricants, water, spare tire assembly mounted, accessories, equipment, tools, tire chains and the maximum payload. The wheelbase shall be approximately 132 inches for dump trucks and 156 inches for stake trucks.

D-2. Frame. The chassis frame shall be strongly braced and reinforced with cross members and of such design and construction as to support adequately the gross weight of the body, maximum payload, power plant and other required equipment for off-the-road service as stated under "Service Requirements."

D-3 Power Units. Federal Specification KKK-T-701a applies. Power unit to be standard production for model truck offered.

D-4. Engine. Not less than six (6) cylinder and equipped with an oil bath type air cleaner of one quart size which will permit dumping of dirt accumulated in the oil reservoir.

F-1c. G.V.W. complying with these specifications_____ __lbs.

F-1d. Weight distribution: Gross weight on tires, front_____ rear_____.

F-1e. Wheelbase_____inches

F-1f. Distance from rear of cab to rear of frame_____inches

F-1g. Frame, maximum depth_____; flange width at critical point_____ _____material thickness_____

F-1h. Elastic limit_____per square inch.

F-2. Engine, Make_____Model_____

F-2a. Number of cylinders_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____at_____R.P.M.

F-2d. Maximum torque, net_____pound feet.

F-3. Clutch, Make_____Model_____
Torque capacity_____pound feet.

F-4. Transmission. Make_____Model_____

F-4a. Gear ratio: First_____; second_____; third_____; fourth or high_____

F-5. Front axle. Maximum allowable load on tires at ground_____lbs

F-6. Rear axle. Maximum allowable load on tires at ground_____lbs
Gear ratio_____.

F-7. Service brakes. Braking area_____

F-8. Tires. Size_____ply_____

F-9. Turning circle. Diameter to outside wheel_____

F-10. Body, Make_____Model_____

of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout, windshield to be plate grade.

Color: Specify color required.

E. Test Requirements - None

F- Questionnaire. No bid will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

To be Used with Dumps.

F-1. Chassis - Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs.
F-1b. Straight commercial G.V.W. Rating_____lbs.
F-1c. G.V.W. Complying with these specifications_____lbs.
F-1d. Weight distribution: Gross weight on tires front_____
rear_____
F-1e. Wheelbase_____inches.
F-1f. Distance from rear of cab to rear of frame_____inches.
F-1g. Frame, maximum depth_____; flange width at critical point
_____; material thickness_____.
F-1h. Elastic limit_____per square inch.
F-2. Engine, Make_____Model_____
F-2a. Number of cylinders_____
F-2b. Cubic inch piston displacement_____
F-2c. Maximum brake horsepower_____at_____R.P.M.
F-2d. Maximum torque, net_____pound feet.
F-3. Clutch. Make_____Model_____
Torque capacity_____pound feet.
F-4. Transmission. Make_____Model_____
F-4a. Gear ratio: First_____; Second_____
Third_____; fourth or high_____
F-5. Front Axle. Maximum allowable load on tires at ground_____lbs.
F-6. Rear axle. Maximum allowable load on tires at ground_____lbs.
Gear ratio_____.
F-7. Service brakes. Braking area_____
F-8. Tires. Size_____ply_____
F-9. Turning circle. Diameter to outside wheel_____
F-10. Body, Make_____Model_____
Hoist (if required) Make_____Model_____

To be Used with Stakes.

F-1. Chassis. Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs_____
F-1b. Straight commercial G.V.W. rating_____lbs.

D-15. Brakes. The truck shall be provided with an adequate braking system that will safely control the fully equipped and loaded truck at all times, under all operating conditions. Service brake shall be of the four wheel type, capable of bringing the fully equipped and loaded truck to a complete stop at a rate of deceleration equivalent to a stop within twenty-five (25) feet from a speed of twenty (20) miles per hour on a dry hard, approximately level road, free from loose materials. There shall be no evidence of excessive fading. Parking brake shall be the manufacturers standard production capable of controlling and holding the fully equipped and loaded vehicle while traveling on a thirty (30) per cent grade.

D-16. Electrical Equipment. Federal Specification KKK-T-701a applies. Battery of not less than 94 ampere hours at a 20 hour rate. The lighting equipment and permanently installed safety, lighting and reflector devices shall be the manufacturers' standard, provided that the equipment shall be complete, conforming to I.C.C. Safety Regulations.

D-17. Chassis Equipment. The truck shall be equipped with all standard accessories including but not restricted to the following: Electric signal horn; two automatic windshield wipers; rear vision mirror giving unobstructed rear view; ignition lock; tire pump; kit of tools; 3-ton capacity jack; grease gun; spare tire lock; front fenders and running boards; instrument panel with speedometer, ammeter, oil guage, heat indicator and electric gasoline guage. Voltage regulator or other suitable arrangement to prevent overcharging of battery must be furnished. Tail light and license bracket shall be installed at rear of truck in such manner as to protect these parts from damage. Viscosity instrument may be specified.

D-18. Controlling Mechanism. Federal Specification KKK-T-701a applies.

D-19. Body and Cab.

(a) Stake: The body to be standard production stake body with loading space approximately 144" long, 84" wide, stakes approximately 38" high. Cabs shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The windows of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout; windshield to be plate grade.

(b). Dumps: The body to be $1\frac{1}{2}$ yard all steel dump body with double acting tail gate and supporting chains. Body to be 8 guage and supplied with side braces and rub rails. Stake pockets to be furnished on front and sides of body. Body shall be not more than 8 feet long.
Hoist: To be underbody hydraulic type and be complete with power take-off and with controlls located within the cab.
Cab: The cab shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The window of the

D-5. Cooling System. The cooling system shall be of the force feed type, using a pump as a circulating agent, and must be of such design and efficiency as to keep the engine at an economical operating temperature under all operating conditions. A heavy duty radiator, of the largest size, offered commercially for the particular truck bid on to meet the service conditions described, is required.

D-6. Lubricating System. Standard production acceptable. An efficient oil filter to be provided.

D-7. Ignition System. Federal Specification KKK-T-701a applies.

D-8. Fuel System. Standard production acceptable, except that tank filler pipes must be located outside the cab.

D-9. Clutch. Federal Specification KKK-T-701a applies. The torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine.

D-10. Transmission. Federal Specification KKK-T-701a applies. The input torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine. Not less than four (4) speeds forward and one speed reverse.

D-11. Axles. Federal Specification KKK-T-701a applies. Rear axle to be of the bevel gear driven type. The gear ratio shall be the lowest standard production furnished the commercial trade by the manufacturer. The input torque capacity of the axle furnished shall be at least equal to the maximum (gross) torque of the engine as developed through the lowest gear reduction provided in the transmission assembly. The front wheel cramping angle shall be such as to enable the truck to negotiate sharp curves readily.

D-12. Springs. Federal Specification KKK-T-701a applies. To be equipped with auxiliary or overload springs.

D-13. Shock Absorbers. Shock absorbers to be furnished front and rear on stake trucks and front only on dumps.

D-14 Wheels and Tires. Wheels shall be of the manufacturers' standard production. Dual wheels shall be provided on the rear axle. Tires shall be of the heavy duty truck and buss balloon type size 7.00 x 20, 8 ply. All wheels, or rims, tires and tubes respectively, shall be interchangeable. Dual wheel spacing and surrounding clearances shall be sufficient to permit installation and satisfactory use of tire chains. Each truck shall be provided with one spare wheel or rim without tire and tube mounted so as not to interfere with use of door or restrict side or ground clearance. No mounting required for dump trucks.

A-MVT- 125
April 6, 1939
Covering Fed. Spec.
KKK-T-701a

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Heavy Duty
Maximum 4500 pound payload
Dump and Stake Trucks.

A. Applicable Federal and other specifications.

B. General

C. Service Requirements.

The conditions under which these trucks are to be operated are to be fully described by the Bureau requiring this type of truck. The specification is to be employed only when heavy duty service is involved and when such service is approximately 60% off-the-road; i.e., Class "C" Service.

D. Specifications.

D-1. Chassis. The Chassis shall be of sturdy construction, capable of withstanding the strains of the service as described under "Service Requirements." It shall have a minimum dry chassis weight of thirty-two hundred and fifty (3250) pounds, including the chassis complete (less fuell, motor lubricant, water, brush guard when specified, front bumper, spare tire, wheel and rim assembly, cab, tools, equipment, body, hoist when specified, and payload); and shall have a payload carrying capacity of not less than four thousand (4000) pounds under off-the-road service and as stated under Service Requirements, and shall have a payload carrying capacity of four thousand five hundred (4500) pounds under normal operating conditions, including the operating personnel. The latter loading condition will prevail for 40% of its operating time. The maximum gross weight shall be consistent with the load requirements and shall include the weight of the chassis complete, cab, body complete, including hoist when specified, fuel, lubricants, water, spare tire assembly mounted, accessories, equipment, tools, tire chains and the maximum payload. The wheelbase shall be approximately 132 inches for dump trucks and 156 inches for stake trucks.

D-2. Frame. The chassis frame shall be strongly braced and reinforced with cross members and of such design and construction as to support adequately the gross weight of the body, maximum payload, power plant and other required equipment for off-the-road service as stated under "Service Requirements."

D-3 Power Units. Federal Specification KKK-T-701a applies. Power unit to be standard production for model truck offered.

D-4. Engine. Not less than six (6) cylinder and equipped with an oil bath type air cleaner of one quart size which will permit dumping of dirt accumulated in the oil reservoir.

F-1c. G.V.W.complying with these specifications_____ __lbs.

F-1d. Weight distribution: Gross weight on tires, front_____ rear_____.

F-1e. Wheelbase_____inches

F-1f. Distance from rear of cab to rear of frame_____inches

F-1g. Frame, maximum depth_____; flange width at critical point_____ _____material thickness_____

F-1h. Elastic limit_____per square inch.

F-2. Engine, Make_____Model_____

F-2a. Number of cylinders_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____at_____R.P.M.

F-2d. Maximum torque, net_____pound feet.

F-3. Clutch, Make_____Model_____ Torque capacity_____pound feet.

F-4. Transmission. Make_____Model_____

F-4a. Gear ratio: First_____; second_____; third_____; fourth or high_____

F-5. Front axle. Maximum allowable load on tires at ground_____lbs

F-6. Rear axle. Maximum allowable load on tires at ground_____lbs Gear ratio_____.

F-7. Service brakes. Braking area_____

F-8. Tires. Size_____ply_____

F-9. Turning circle. Diameter to outside wheel_____

F-10. Body, Make_____Model_____

of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout, windshield to be plate grade.

Color: Specify color required.

E. Test Requirements - None

F- Questionnaire. No bid will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

To be Used with Dumps.

F-1. Chassis - Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs.
F-1b. Straight commercial G.V.W. Rating_____lbs.
F-1c. G.V.W. Complying with these specifications_____lbs.
F-1d. Weight distribution: Gross weight on tires front_____
rear_____
F-1e. Wheelbase_____inches.
F-1f. Distance from rear of cab to rear of frame_____inches.
F-1g. Frame, maximum depth_____; flange width at critical point
_____; material thickness_____.
F-1h. Elastic limit_____per square inch.
F-2. Engine, Make_____Model_____
F-2a. Number of cylinders_____ _____
F-2b. Cubic inch piston displacement_____
F-2c. Maximum brake horsepower_____at_____R.P.M.
F-2d. Maximum torque, net_____pound feet.
F-3. Clutch. Make_____Model_____
Torque capacity_____pound feet.
F-4. Transmission. Make_____Model_____
F-4a. Gear ratio: First_____; Second_____
Third_____; fourth or high_____
F-5. Front Axle. Maximum allowable load on tires at ground_____lbs.
F-6. Rear axle. Maximum allowable load on tires at ground_____lbs.
Gear ratio_____.
F-7. Service brakes. Braking area_____
F-8. Tires. Size_____ply_____
F-9. Turning circle. Diameter to outside wheel_____
F-10. Body, Make_____Model_____
Hoist (if required) Make_____Model_____

To be Used with Stakes.

F-1. Chassis. Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs_____
F-1b. Straight commercial G.V.W. rating_____lbs.

D-15. Brakes. The truck shall be provided with an adequate braking system that will safely control the fully equipped and loaded truck at all times, under all operating conditions. Service brake shall be of the four wheel type, capable of bringing the fully equipped and loaded truck to a complete stop at a rate of deceleration equivalent to a stop within twenty-five (25) feet from a speed of twenty (20) miles per hour on a dry hard, approximately level road, free from loose materials. There shall be no evidence of excessive fading. Parking brake shall be the manufacturers standard production capable of controlling and holding the fully equipped and loaded vehicle while traveling on a thirty (30) per cent grade.

D-16. Electrical Equipment. Federal Specification KKK-T-701a applies. Battery of not less than 94 ampere hours at a 20 hour rate. The lighting equipment and permanently installed safety, lighting and reflector devices shall be the manufacturers' standard, provided that the equipment shall be complete, conforming to I.C.C. Safety Regulations.

D-17. Chassis Equipment. The truck shall be equipped with all standard accessories including but not restricted to the following: Electric signal horn; two automatic windshield wipers; rear vision mirror giving unobstructed rear view; ignition lock; tire pump; kit of tools; 3-ton capacity jack; grease gun; spare tire lock; front fenders and running boards; instrument panel with speedometer, ammeter, oil guage, heat indicator and electric gasoline guage. Voltage regulator or other suitable arrangement to prevent overcharging of battery must be furnished. Tail light and license bracket shall be installed at rear of truck in such manner as to protect these parts from damage. Viscosity instrument may be specified.

D-18. Controlling Mechanism. Federal Specification KKK-T-701a applies.

D-19. Body and Cab.

(a) Stake: The body to be standard production stake body with loading space approximately 144" long, 84" wide, stakes approximately 38" high. Cabs shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The windows of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout; windshield to be plate grade.

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Hoist: To be underbody hydraulic type and be complete with power take-off and with controlls located within the cab.
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D-6. Lubricating System. Standard production acceptable. An efficient oil filter to be provided.

D-7. Ignition System. Federal Specification KKK-T-701a applies.

D-8. Fuel System. Standard production acceptable, except that tank filler pipes must be located outside the cab.

D-9. Clutch. Federal Specification KKK-T-701a applies. The torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine.

D-10. Transmission. Federal Specification KKK-T-701a applies. The input torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine. Not less than four (4) speeds forward and one speed reverse.

D-11. Axles. Federal Specification KKK-T-701a applies. Rear axle to be of the bevel gear driven type. The gear ratio shall be the lowest standard production furnished the commercial trade by the manufacturer. The input torque capacity of the axle furnished shall be at least equal to the maximum (gross) torque of the engine as developed through the lowest gear reduction provided in the transmission assembly. The front wheel cramping angle shall be such as to enable the truck to negotiate sharp curves readily.

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A-MVT- 125
April 6, 1939
Covering Fed. Spec.
KKK-T-701a

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE

Specifications for Heavy Duty
Maximum 4500 pound payload
Dump and Stake Trucks.

A. Applicable Federal and other specifications.

B. General

C. Service Requirements.

The conditions under which these trucks are to be operated are to be fully described by the Bureau requiring this type of truck. The specification is to be employed only when heavy duty service is involved and when such service is approximately 60% off-the-road; i.e., Class "C" Service.

D. Specifications.

D-1. Chassis. The Chassis shall be of sturdy construction, capable of withstanding the strains of the service as described under "Service Requirements." It shall have a minimum dry chassis weight of thirty-two hundred and fifty (3250) pounds, including the chassis complete (less fuell, motor lubricant, water, brush guard when specified, front bumper, spare tire, wheel and rim assembly, cab, tools, equipment, body, hoist when specified, and payload); and shall have a payload carrying capacity of not less than four thousand (4000) pounds under off-the-road service and as stated under Service Requirements, and shall have a payload carrying capacity of four thousand five hundred (4500) pounds under normal operating conditions, including the operating personnel. The latter loading condition will prevail for 40% of its operating time. The maximum gross weight shall be consistent with the load requirements and shall include the weight of the chassis complete, cab, body complete, including hoist when specified, fuel, lubricants, water, spare tire assembly mounted, accessories, equipment, tools, tire chains and the maximum payload. The wheelbase shall be approximately 132 inches for dump trucks and 156 inches for stake trucks.

D-2. Frame. The chassis frame shall be strongly braced and reinforced with cross members and of such design and construction as to support adequately the gross weight of the body, maximum payload, power plant and other required equipment for off-the-road service as stated under "Service Requirements."

D-3 Power Units. Federal Specification KKK-T-701a applies. Power unit to be standard production for model truck offered.

D-4. Engine. Not less than six (6) cylinder and equipped with an oil bath type air cleaner of one quart size which will permit dumping of dirt accumulated in the oil reservoir.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS
WASHINGTON, D. C.

April 5, 1939

Technical Advisory Board.

TECHNICAL ADVISORY BOARD CIRCULAR NO. 10.

Subject: Standard Specifications Covering Heavy Duty, Maximum 4500 Pound Payload, Stake and Dump Trucks.

To Chief of Bureaus and Offices:

Pursuant to the Secretary's memorandum of June 8, 1938, defining the duties of the Technical Advisory Board, a specification has been prepared covering heavy duty, maximum 4500 pound payload stake and dump trucks for use throughout the Department.

This specification is tentatively designated No. A-MVT-125, two copies of which are attached. Your comments and criticisms are invited and it is requested that your replies be forwarded to this office not later than April 30, 1939.

OTTO ENGELMANN

Chairman, Technical Advisory Board.

(ENCLOSURES)

A-MVT- 125
April 6, 1939
Covering Fed. Spec.
KKK-T-701a

(Proposed) UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Heavy Duty
Maximum 4500 pound payload
Dump and Stake Trucks.

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The conditions under which these trucks are to be operated are to be fully described by the Bureau requiring this type of truck. The specification is to be employed only when heavy duty service is involved and when such service is approximately 60% off-the-road; i.e., Class "C" Service.

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D-2. Frame. The chassis frame shall be strongly braced and reinforced with cross members and of such design and construction as to support adequately the gross weight of the body, maximum payload, power plant and other required equipment for off-the-road service as stated under "Service Requirements."

D-3 Power Units. Federal Specification KKK-T-701a applies. Power unit to be standard production for model truck offered.

D-4. Engine. Not less than six (6) cylinder and equipped with an oil bath type air cleaner of one quart size which will permit dumping of dirt accumulated in the oil reservoir.

D-5. Cooling System. The cooling system shall be of the force feed type, using a pump as a circulating agent, and must be of such design and efficiency as to keep the engine at an economical operating temperature under all operating conditions. A heavy duty radiator, of the largest size, offered commercially for the particular truck bid on to meet the service conditions described, is required.

D-6. Lubricating System. Standard production acceptable. An efficient oil filter to be provided.

D-7. Ignition System. Federal Specification KKK-T-701a applies.

D-8. Fuel System. Standard production acceptable, except that tank filler pipes must be located outside the cab.

D-9. Clutch. Federal Specification KKK-T-701a applies. The torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine.

D-10. Transmission. Federal Specification KKK-T-701a applies. The input torque capacity shall be not less than 15% in excess of the maximum torque developed by the engine. Not less than four (4) speeds forward and one speed reverse.

D-11. Axles. Federal Specification KKK-T-701a applies. Rear axle to be of the bevel gear driven type. The gear ratio shall be the lowest standard production furnished the commercial trade by the manufacturer. The input torque capacity of the axle furnished shall be at least equal to the maximum (gross) torque of the engine as developed through the lowest gear reduction provided in the transmission assembly. The front wheel cramping angle shall be such as to enable the truck to negotiate sharp curves readily.

D-12. Springs. Federal Specification KKK-T-701a applies. To be equipped with auxiliary or overload springs.

D-13. Shock Absorbers. Shock absorbers to be furnished front and rear on stake trucks and front only on dumps.

D-14 Wheels and Tires. Wheels shall be of the manufacturers' standard production. Dual wheels shall be provided on the rear axle. Tires shall be of the heavy duty truck and buss balloon type size 7.00 x 20, 8 ply. All wheels, or rims, tires and tubes respectively, shall be interchangeable. Dual wheel spacing and surrounding clearances shall be sufficient to permit installation and satisfactory use of tire chains. Each truck shall be provided with one spare wheel or rim without tire and tube mounted so as not to interfere with use of door or restrict side or ground clearance. No mounting required for dump trucks.

D-15. Brakes. The truck shall be provided with an adequate braking system that will safely control the fully equipped and loaded truck at all times, under all operating conditions. Service brake shall be of the four wheel type, capable of bringing the fully equipped and loaded truck to a complete stop at a rate of deceleration equivalent to a stop within twenty-five (25) feet from a speed of twenty (20) miles per hour on a dry hard, approximately level road, free from loose materials. There shall be no evidence of excessive fading. Parking brake shall be the manufacturers standard production capable of controlling and holding the fully equipped and loaded vehicle while traveling on a thirty (30) per cent grade.

D-16. Electrical Equipment. Federal Specification KKK-T-701a applies. Battery of not less than 94 ampere hours at a 20 hour rate. The lighting equipment and permanently installed safety, lighting and reflector devices shall be the manufacturers' standard, provided that the equipment shall be complete, conforming to I.C.C. Safety Regulations.

D-17. Chassis Equipment. The truck shall be equipped with all standard accessories including but not restricted to the following: Electric signal horn; two automatic windshield wipers; rear vision mirror giving unobstructed rear view; ignition lock; tire pump; kit of tools; 3-ton capacity jack; grease gun; spare tire lock; front fenders and running boards; instrument panel with speedometer, ammeter, oil guage, heat indicator and electric gasoline guage. Voltage regulator or other suitable arrangement to prevent overcharging of battery must be furnished. Tail light and license bracket shall be installed at rear of truck in such manner as to protect these parts from damage. Viscosity instrument may be specified.

D-18. Controlling Mechanism. Federal Specification KKK-T-701a applies.

D-19. Body and Cab.

(a) Stake: The body to be standard production stake body with loading space approximately 144" long, 84" wide, stakes approximately 38" high. Cabs shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The windows of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout; windshield to be plate grade.

(b). Dumps: The body to be 1½ yard all steel dump body with double acting tail gate and supporting chains. Body to be 8 guage and supplied with side braces and rub rails. Stake pockets to be furnished on front and sides of body. Body shall be not more than 8 feet long.
Hoist: To be underbody hydraulic type and be complete with power take-off and with controlls located within the cab.
Cab: The cab shall be of the fully enclosed standard type with all standard equipment and with insulated roof, and shall be of steel construction with all steel or waterproof fabric top. The window of the

of the rear of the cab shall be covered with a rust-proof removable screen, wires not less than 1/8 inch in diameter, 1/2 inch mesh. Cab doors to be provided with suitable locks, one to be outside lock with key. Safety glass shall be furnished throughout, windshield to be plate grade.

Color: Specify color required.

E. Test Requirements - None

F- Questionnaire. No bid will receive consideration unless the bidder has furnished with his bid the following questionnaire, fully completed.

To be Used with Dumps.

F-1. Chassis - Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs.
F-1b. Straight commercial G.V.W. Rating_____lbs.
F-1c. G.V.W. Complying with these specifications_____lbs.
F-1d. Weight distribution: Gross weight on tires front_____
rear_____
F-1e. Wheelbase_____inches.
F-1f. Distance from rear of cab to rear of frame_____inches.
F-1g. Frame, maximum depth_____; flange width at critical point
_____; material thickness_____.
F-1h. Elastic limit_____per square inch.
F-2. Engine, Make_____Model_____
F-2a. Number of cylinders_____
F-2b. Cubic inch piston displacement_____
F-2c. Maximum brake horsepower_____at_____R.P.M.
F-2d. Maximum torque, net_____pound feet.
F-3. Clutch. Make_____Model_____
Torque capacity_____pound feet.
F-4. Transmission. Make_____Model_____
F-4a. Gear ratio: First_____; Second_____
Third_____; fourth or high_____
F-5. Front Axle. Maximum allowable load on tires at ground_____lbs.
F-6. Rear axle. Maximum allowable load on tires at ground_____lbs.
Gear ratio_____.
F-7. Service brakes. Braking area_____
F-8. Tires. Size_____ply_____
F-9. Turning circle. Diameter to outside wheel_____
F-10. Body, Make_____Model_____
Hoist (if required) Make_____Model_____

To be Used with Stakes.

F-1. Chassis. Make_____Model_____
F-1a. Dry chassis weight stripped_____lbs_____
F-1b. Straight commercial G.V.W. rating_____lbs.

F-1c. G.V.W. complying with these specifications_____ __lbs.

F-1d. Weight distribution: Gross weight on tires, front_____ rear_____.

F-1e. Wheelbase_____inches

F-1f. Distance from rear of cab to rear of frame_____inches

F-1g. Frame, maximum depth_____; flange width at critical point_____ _____material thickness_____

F-1h. Elastic limit_____per square inch.

F-2. Engine, Make_____Model_____

F-2a. Number of cylinders_____

F-2b. Cubic inch piston displacement_____

F-2c. Maximum brake horsepower_____at_____R.P.M.

F-2d. Maximum torque, net_____pound feet.

F-3. Clutch, Make_____Model_____
Torque capacity_____pound feet.

F-4. Transmission. Make_____Model_____

F-4a. Gear ratio: First_____; second_____; third_____; fourth or high_____

F-5. Front axle. Maximum allowable load on tires at ground_____lbs

F-6. Rear axle. Maximum allowable load on tires at ground_____lbs
Gear ratio_____.

F-7. Service brakes. Braking area_____

F-8. Tires. Size_____ply_____

F-9. Turning circle. Diameter to outside wheel_____

F-10. Body, Make_____Model_____

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS
WASHINGTON, D. C.

July 19, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 11.

Subject: Standard Specifications Covering
Power Sprayers Heavy Duty

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum, No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a specification has been prepared covering power sprayers, heavy duty, for use throughout the Department.

This specification is tentatively designated No. A-FPS-G-661, a copy of which is attached.

Your comments and criticisms are invited and it is requested that your replies be forwarded to this office not later than August 15, 1939.

Otto Engelmann
Chairman, Technical Advisory Board

(Enclosures)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Specifications
for
Power Sprayer Heavy Duty

July 18, 1939
A-FPS-O- 661

C. SERVICE REQUIREMENTS

Bureau to supply a brief and concise statement substantiating the need for the particular type and size of apparatus specified. Statement shall indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d) Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special feature, attachments and accessories.

D. SPECIFICATIONS.

It is the intent of this specification to describe a heavy duty power spraying outfit of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with sprayers of this type and class whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, capacity, and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate in an amount not exceeding 5% less than any single requirement specified, provided that the unit is, in other particulars, substantially in accordance with the specifications and that such deviation does not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Type

A. Tractor drawn four-wheel type with independent power unit.
B. Tractor drawn two-wheel type with tractor power-take-off drive.
C. Skid-style truck outfit with independent power unit.
D. Motor truck power-take-off outfit.

D-2. Size and Capacity.

The sprayer shall fulfill the requirements for capacity in gallons per minute at the indicated pressure in pounds per square inch with

not more than the horsepower specified.

D-2a. Power Sprayers

Class	Capacity in Gals per Minute	Pounds Pressure	Maximum Horsepower	Minimum Tank Capacity
G-10	10	500	2-1/2	100
G-15	15	600	9	200
G-20	20	600	12	300
G-25	25	600	15	300
G-30	30	700	18	300
G-35	35	700	20	300
G-40	40	700	25	400
G-45	45	700	30	400
G-50	50	800	35	400
G-60	60	800	40	400

D-3. Power Plants

The power units furnished with type A and C sprayers shall be the current production model internal combustion engine using gasoline as a fuel. It shall be a four stroke cycle engine particularly adapted for this service complete with all necessary starting and operating accessories, capable of operating indefinitely under full load without overheating when supplied with "G" grade fuel, Federal Specification VV-G-101a.

The engine furnished shall be capable of operating the sprayer indefinitely at the capacity specified without overheating and while running at normal recommended speed.

D-4. Pumps

The pump shall have a capacity as specified by class and be equipped with air chamber, pressure regulator and pressure guage reading up to 800 pounds persquare inch. Displacement chamber lining, valve chambers of pump, valve seats, valve caps, plungers and all other pump parts exposed to spray materials under pressure shall be of phosphor bronze, stainless steel, or other rust resisting material of sufficient strength and hardness to satisfactorily withstand pressure requirements indicated. Outlets should be provided for two lines of hose.

D-5. Lubrication shall be of the splash or force feed or a combination of both. Other standard methods of lubrication may be accepted if the moving parts are completely enclosed from dust and sand.

D-6. Where plungers come in contact with spray material, they shall be of stainless steel of 18-8 or of equal construction to resist corrosion. Cylinders when exposed to contact with moving parts, shall be of porcelain or equal material.

D-7. The valves shall be of the stainless steel ball type.

D-8. An automatic pressure regulator shall be provided with ample capacity to handle the full output of the pump when all nozzles are closed. Regulation should be such that the engine will not be required to start under load.

D-9. All drives shall be either direct, V-belt, or roller chain, unless otherwise specified.

D-10. The tank shall be of copper alloy, non-corrosive, steel, or equal. The tank opening shall be equipped with a leak proof covering and the filler opening of the tank shall be provided with an efficient type strainer mounted in a wooden box and equipped with a flushing attachment for cleaning the strainer without removing it from the strainer box. An easily operated cutoff, not subject to corrosion, must be provided between the tank and the pump.

D-11. The tank agitator shall be of sufficient size and proper design to give adequate agitation to materials. The agitator drive shall be direct through thermoid or equal coupling or roller chain.

D-12. The suction line shall be provided with an efficient type strainer which can be easily cleaned.

D-13. When chain or V-belt drives are used to either pump or agitator the pump and engine shall be completely enclosed with a metal hood, but at the same time must be readily accessible for inspection or adjustment.

D-14. The outfit shall be equipped with a tank refiller of not less than 70 gallon per minute capacity with at least 15 feet of not less than two inch wire jacketed suction hose.

D-15. On type B sprayers, all necessary power-take-off accessories shall be supplied to operate satisfactorily on tractor specified.

D-16. On type D sprayers, all necessary power-take-off accessories shall be supplied to operate satisfactorily on truck specified.

E. TESTS

None, unless required by requisitioning bureau.

F. Bids must be accompanied by the following questionnaire fully completed by the bidder.

F-1. Make of sprayer _____ Model _____

F-2. Weight of standard unit _____

F-3. Shipping weight_____

F-4. Type of drive used to pump_____
Type of drive used to agitator_____

F-5. Horsepower required to meet capacity of pump specified._____

F-6. Horsepower at normal speed of engine furnished_____

F-7. Capacity of tank_____

F-8. Size and ply of tires furnished_____

F-9. Sprayers we propose to furnish under this invitation to bid deviate from the specification requirements in the following particulars

_____

_____

F-10. It is agreed that in the event exceptions are not listed or filed under F-9 above, the right is reserved to demand full and complete compliance with the specification requirements.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT AND OPERATIONS
WASHINGTON, D.C.

July 28, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 12.

Subject: Standard Specifications Covering Mowers, Heavy Duty, Tractor-type.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum, No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a specification has been prepared covering mowers, heavy duty, tractor-type for use throughout the Department.

Two copies of this specification are attached for your comment and criticism. It is requested that your replies be forwarded to this office not later than August 30, 1939.

OTTO ENGELMANN
Chairman, Technical Advisory Board

(Enclosures)

UNITED STATES DEPARTMENT OF AGRICULTURE

(Proposed) Specifications for Mowers, Heavy Duty Tractor-Type

A-FMT-
July 28, 1939

A. APPLICABLE SPECIFICATIONS

B. GENERAL CONDITIONS

C. SERVICE REQUIREMENTS

Bureau to supply a brief and concise statement substantiating the need for the particular type and size of apparatus specified. Statement shall indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d) Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special features, attachments and accessories.
(g) Turning radius to be specified.

D. SPECIFICATIONS.

It is the intent of this specification to describe a heavy duty, tractor-type mower of the sickle bar type of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with mowers of this type whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions and mechanical features are intended to describe and define a group of units which experience has shown are comparable and substantially equivalent in stamina and performance.

D-1. Types

A. Power take-off driven and attached to rear of the tractor. The mower may be entirely supported by the tractor or by small castoring wheels.

B. Power take-off driven and attached to the tractor in front of the right rear wheel.

C. Trailor type with power for operating the cutting unit derived from ground wheels independent of the tractor.

D-2. Sizes.

A. Cutter bar $4\frac{1}{2}$ feet long
B. " " 5 " "
C. " " 6 " "
D. " " 7 " "

D-3. The cutter bar shall be made of high grade steel, oil tempered, shaped so as to resist sagging and with adequate steel wearing plates to protect the knife from wear. The guards shall be spaced 3" apart unless otherwise specified.

D-4. The unit shall have ample protection against breakage through use of safety devices which will prevent breakage where the knife becomes clogged and which will permit the cutter bar to swing back when striking an obstruction.

D-5. Controls shall be provided for raising, lowering and tilting the cutter bar. The controls for raising and lowering the cutter bar shall be easily operated from the tractor seat.

D-6. All gears shall be of machine cut steel fully enclosed, designed for high speed operation, and run in a bath of oil.

D-7. All bearings shall have ample bearing surface and be provided with adequate, dependable and convenient means of lubrication.

D-8. The regular lift cutter bar shall be furnished unless otherwise specified.

D-9. Mower shall be painted according to manufacturer's standard unless otherwise specified.

D-10. Provision shall be made for aligning the cutter bar on the mower, when a pittman is used, for taking up wear to prevent end play.

D-11. Two sickles, oil can or pressure grease gun, tool box and all necessary tools for making adjustments and changes shall be provided with the mower.

D-12. Mower types A and C requiring wheels, unless otherwise specified, shall have the wheels equipped with the manufacturer's standard pneumatic tires. The tire pressures to be in accordance and with the tire loading not to exceed the current recommendation of the Tire and Rim Association for the tires furnished.

E. TESTS

E-1. When standard production units are furnished under this specification, no tests will be required unless the service agency desires to include a field performance test on new or untried equipment.

F. QUESTIONNAIRE.

Bids must be accompanied by the following questionnaire fully completed by the bidder:

F-1. Make of mower_____Model_____

F-2. Shipping weight_____ _____

F-3. Weight of standard unit_____

F-4. Will mower operate on any make of tractor with sufficient power_____

F-5. Type of power transmission from power unit to sickle. Gears_____; V-Belt_____; Roller chain_____;Flat belt_____

F-6. The mower is supported entirely by the tractor_____ Independent wheels_____, or both_____

F-7. Maximum height above ground to which the inner shoe can be raised _____;outer shoe_____

F-8. Mowers we propose to furnish under this invitation to bid deviate from the specification requirements in the following particulars:_____

_____ _____

_____ _____

_____

F-9 . It is agreed that in the event exceptions are not listed or filed under paragraph 8, above, the right is reserved to demand full and complete compliance with the specification requirements.

Signature_____

Title_____

(Proposed)

UNITED STATES DEPARTMENT OF AGRICULTURE
Specifications for Mowers, Heavy Duty Tractor-Type

A-FMT-
July 28, 1939

A. APPLICABLE SPECIFICATIONS

B. GENERAL CONDITIONS

C. SERVICE REQUIREMENTS

Bureau to supply a brief and concise statement substantiating the need for the particular type and size of apparatus specified. Statement shall indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d) Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special features, attachments and accessories.
(g) Turning radius to be specified.

D. SPECIFICATIONS.

It is the intent of this specification to describe a heavy duty, tractor-type mower of the sickle bar type of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with mowers of this type whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions and mechanical features are intended to describe and define a group of units which experience has shown are comparable and substantially equivalent in stamina and performance.

D-1. Types

A. Power take-off driven and attached to rear of the tractor. The mower may be entirely supported by the tractor or by small castoring wheels.

B. Power take-off driven and attached to the tractor in front of the right rear wheel.

C. Trailor type with power for operating the cutting unit derived from ground wheels independent of the tractor.

D-2. Sizes.

A. Cutter bar $4\frac{1}{2}$ feet long
B. " " 5 " "
C. " " 6 " "
D. " " 7 " "

D-3. The cutter bar shall be made of high grade steel, oil tempered, shaped so as to resist sagging and with adequate steel wearing plates to protect the knife from wear. The guards shall be spaced 3" apart unless otherwise specified.

D-4. The unit shall have ample protection against breakage through use of safety devices which will prevent breakage where the knife becomes clogged and which will permit the cutter bar to swing back when striking an obstruction.

D-5. Controls shall be provided for raising, lowering and tilting the cutter bar. The controls for raising and lowering the cutter bar shall be easily operated from the tractor seat.

D-6. All gears shall be of machine cut steel fully enclosed, designed for high speed operation, and run in a bath of oil.

D-7. All bearings shall have ample bearing surface and be provided with adequate, dependable and convenient means of lubrication.

D-8. The regular lift cutter bar shall be furnished unless otherwise specified.

D-9. Mower shall be painted according to manufacturer's standard unless otherwise specified.

D-10. Provision shall be made for aligning the cutter bar on the mower, when a pittman is used, for taking up wear to prevent end play.

D-11. Two sickles, oil can or pressure grease gun, tool box and all necessary tools for making adjustments and changes shall be provided with the mower.

D-12. Mower types A and C requiring wheels, unless otherwise specified, shall have the wheels equipped with the manufacturer's standard pneumatic tires. The tire pressures to be in accordance and with the tire loading not to exceed the current recommendation of the Tire and Rim Association for the tires furnished.

E. TESTS

E-1. When standard production units are furnished under this specification, no tests will be required unless the service agency desires to include a field performance test on new or untried equipment.

F. QUESTIONNAIRE.

Bids must be accompanied by the following questionnaire fully completed by the bidder:

F-1. Make of mower_____Model_____

F-2. Shipping weight_____ _____

F-3. Weight of standard unit_____

F-4. Will mower operate on any make of tractor with sufficient power_____

F-5. Type of power transmission from power unit to sickle. Gears_____; V-Belt_____; Roller chain_____;Flat belt_____

F-6. The mower is supported entirely by the tractor_____ Independent wheels_____, or both_____

F-7. Maximum height above ground to which the inner shoe can be raised _____;outer shoe_____

F-8. Mowers we propose to furnish under this invitation to bid deviate from the specification requirements in the following particulars:_____

_____ _____

_____ _____

_____

F-9 . It is agreed that in the event exceptions are not listed or filed under paragraph 8, above, the right is reserved to demand full and complete compliance with the specification requirements.

Signature_____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

August 23, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 13.

Subject: Tentative Standard Specifications Covering Disk Harrows-Tractor Drawn

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's Memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering disk harrows, tractor drawn which, when promulgated, will be for the general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS", and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The statement should indicate:

(a) Nature and extent of work.
(b) Location of work immediately in prospect and for duration of service life.
(c) Adaptation of the type of unit to the work.
(d) Size and capacity requirements to maintain the optimum rate of progress.
(e) Experience with apparatus of smaller size and lesser capacity indicative of inability to fulfill these service requirements.
(f) Conditions peculiar to the work which require special features, attachments and accessories.

It has been rather difficult to prepare standard specifications for disk harrows due to the fact that there are several types of harrows with so many variations possible in disk diameters; spacings between disks; width of cut; and weights. Therefore, a brief explanation of the reasons for the proposed classifications of disks and the designated sizes might be helpful.

D-1. Types of Disks.

All disk harrows are either single action or double action. The single action disk harrow, especially in Class I Regular Cut, with widths of 8 to 12 feet, is adapted to light tractors.

The double action disk harrows, quite frequently referred to as the tandem disk harrow, have been divided into four classes, primarily from the standpoint of their use. Class I, regular tandem four gang disk harrows are usually Grade B, heavy duty or Grade C, light duty harrows.

Class II, cover crop, tandem four gang disk harrows are similar in design to Class I but are usually a Grade A, extra heavy duty type. As the name implies, these harrows are used for disking ground covered with trash or a heavy cover growth. The disk spacings are wider, usually about 9 inches and the disk diameters are greater than on Class I disk harrows.

Class III, Orchard, tandem four gang disk harrows are similar to Class I or Class II, but usually more on the cover crop type except that the frames are built low to facilitate working under trees.

Class IV, orchard offset two gang disk harrows are of the tandem type but have only two gangs of disks. These disk harrows are designed particularly for orchard work.

D-2. Grades of Double Action Disk Harrows.

Theweight of a disk harrow has considerable bearing upon its proper operation. Yet, the variations in weight are so numerous with so many possible combinations of disk diameters, spacings and overall width that it was deemed impracticable to set up tables giving definite weight limitations. Therefore, it is proposed to establish three grades of disk harrows according to the weight, - Grade A, extra heavy duty; Grade B, heavy duty; and Grade C, light duty.

The weight per foot of width for each grade was selected for the most popular disk diameter and spacing for that class of disk harrow. It is believed that if a manufacturer's disk harrow of this particular size meets the weight specification for the model of disk harrow offered, all other sizes of disk harrows of this particular model should be equally satisfactory from a weight standpoint, as they would be of the same general design and construction. For example, if a bureau desired to purchase a Grade A, extra heavy duty disk harrow with 20 inch diameter disks, spaced 7 inches apart, the same model as offered by the manufacturer but of 22 inch diameter disk and 9 inch spacing would be checked to see if it met the weight specifications. If this particular size harrow met the weight specification of approximately 200 pounds per foot of width, then the smaller disk harrow offered should be equally acceptable in the same model.

D-3. Sizesof Disks.

In standardizing the disk harrows as to sizes, it was necessary to establish only approximations and allow a 10% variation in disk spacings and the total weight of disk harrows. For example, one manufacturer has a standard 6 inch spacing, another 6½ inch spacing, and still another 6-5/8 inch spacing of disks. The operation of units with any of these spacings compare favorably, yet cause a variation in the total width of the units offered by different manufacturers. Therefore, if the specifications call for a 6 inch disk spacing, a spacing of 6-5/8 inches would be acceptable, but not a 7 inch spacing. Likewise, a specification calling for a 5 foot disk would admit a 5½ foot disk, but not one of six feet.

Other sizes than those listed are available, but they are for special work, and are restrictive to one or to a few manufacturers and can be purchased only when service requirements do not permit the use of standard sizes.

The following example is given to illustrate how these specifications should be used to designate the proper disk harrow: If a bureau desires to purchase a double action or tandem disk harrow, of the regular four gang, heavy duty type, of approximately 7 feet in width with 18 inch disks, spaced approximately 6 inches apart, the invitation to bid should specify as follows:

> DISK HARROW, Type B, Class I; Grade B, double action, of approximately 7 feet in width equipped with 18 inch disks spaced approximately 6 inches apart in accordance with the attached U. S. Department of Agriculture Standard Specification A-FDH-.

It is hoped that these brief comments will be of assistance to bureaus in reviewing these proposed specifications.

The Board would appreciate receiving your comments and suggestions not later than September 20, 1939.

W. K. KNAUFF
Acting Chairman, Technical Advisory Board

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE

(Proposed) Tentative Specifications for Disk Harrows-Tractor Drawn

A-FDH
August 23, 1939

D. SPECIFICATIONS.

It is the intent of this specification to describe a tractor-drawn disk harrow of conventional design and sturdy construction, complete with all operating accessories customarily furnished with disk harrows of this type, class and grade whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate not more than 10%, plus or minus, in disk spacing and total width of disk, and not more than 10% less in weight, provided that the unit is, in other particulars, substantially in accordance with the specifications and that such deviation does not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

The disk harrow furnished shall be of the type, class, grade and size, with disk diameter and spacing, as specified in the invitation to bid.

D-1. Type of Disk Harrows.

A. Single action
Class I. Regular cut.
Class II. Wide cut folding gang.

B. Double action.
Class I. Regular tandem 4 gang.
Class II. Cover crop tandem 4 gang.
Class III. Orchard tandem 4 gang.
Class IV. Orchard offset 2 gang.

D-2. Grades of Double Action Disk Harrows.

Grade A, Extra heavy duty. These disks shall weigh not less than approximately 200 pounds per foot of width equipped with 22 inch disks spaced 9 inches apart.

Grade B, Heavy duty. These disks shall weigh not less than approximately 150 pounds per foot of width equipped with 18 inch disks spaced 6 to 7 inches apart.

Grade C. Light duty. These disks shall weigh not less than approximately 125 pounds per foot of width when equipped with 16 inch disks spaced 6 to 7 inches apart.

Other spacings and diameters of disks available in the same model as the dimensions given in the above grades, if standard production, shall be acceptable according to weight if it is the manufacturer's same model, and meets the specifications, as expressed by the sizes in the above grades. The grades of the single disk harrows shall weigh 60% of that of double action disk harrows.

D-3. Sizes of Disk Harrows.

Type A. Class I and II.
Approximate width in feet - 8', 10', 12', 15', and 21'.
Approximate spacing in inches between disks 6" or 7".
Disk diameters in inches 16" or 18".

Type B. Class I.
Approximate width in feet 5', 6', 7', 8', 9', and 10'.
Approximate spacing in inches between disks - 6", 7", 8", 9", and 10".
Disk diameters in inches - 16", 18", 20", and 22".

Type B. Class II and III.
Approximate width in feet - 5', 6½', 7½', 8', 9½', and 11'
Approximate spacing in inches between disks 7", 9", and 10".
Disk diameters in inches 18", 20", 22", and 24".

Type B. Class IV.
Approximate width in feet - 5', 6½', 7½', 8', 9', 10', 11', and 12'.
Approximate spacing in inches between disks, 7" or 9".
Disk diameters in inches 18", 20", 22", and 24".

D-4. Disks. Disk blades shall be made of tough, abrasion resistant, high grade steel, carefully heat treated either electrically or oil tempered after forming. Cutaway disks shall be considered special equipment and unless otherwise specified, all disks furnished under these specifications shall be of the full blade type. The gauge of disk blade shall be the heaviest available for the model of disk offered.

D-5. Bearings. Bearings shall be of the replaceable type and design to carry all loads that may be imposed upon them under severe operating conditions. The bearings on Type A, Class I and II and Type B, Class I, and all Grade C disk harrows may be either hard maple soaked in hot oil, or of all metal construction. The bearings of Type B, Class II, III and IV, except Grade C disk harrows shall be of all metal construction, self aligning and of the dust proof type.

D-6. Lubrication. Disk harrows shall have adequate means of lubrication for all moving parts. All Grade A and B disk harrows shall be equipped with fittings for pressure lubrication of all bearings.

D-7. Arbor Bolts. All arbor bolts, except on Grade C disk harrows, shall be not less than one and one-eighth inches in shortest diameter.

D-8. Angling Devices. Disk harrows shall be equipped with proper controls for changing the angle of the disk gangs. These controls shall be so arranged on Type B, Grade A and B disk harrows that the angling of the disk gangs can be accomplished by the operator from the tractor seat.

D-9. Leveling Device. Disk harrows shall be equipped with some means of holding the gangs approximately level, yet allow flexibility permitting them to follow uneven ground.

D-10. Frame. The frame shall be of sufficiently rugged design to prevent warping, twisting, or breakage under severe operating conditions.

D-11. Scrapers. Disks shall be equipped with high quality adjustable or full blade steel scrapers.

D-12. Weight Boxes. Disk harrows shall be equipped with the manufacturer's standard weight boxes or weights unless otherwise specified.

D-13. Paint. The disk harrows shall be painted a color of manufacturer's standard production unless otherwise specified.

D-14. Accessories. The disk harrow shall be equipped with all necessary tools and appliances of recognized quality sufficient to accomplish all periodic lubrication, field adjustments, emergency repairs and ordinary preventive maintenance. One instruction book and repair parts list shall be furnished with each disk.

D-15. Special Equipment.

D-15a. Depth Gauges. When specified in the invitation, disk harrows shall be equipped with manufacturer's standard depth gauge.

D-15b. Transport Trucks. When specified in invitation, disk harrows shall be equipped with manufacturer's standard transport trucks.

E. TEST REQUIREMENTS.

When standard production units are furnished under this specification, no tests will be required unless otherwise specified.

F. QUESTIONNAIRE.

Bids must be accompanied by the following questionnaire fully completed by the bidders:

F-1. Model No. _____

F-2. Weight of standard unit 5 ft. 740#: 6 ft. 764#; 7 ft. 818#

F-3. Shipping weight _____

F-4. Type of bearings wood

_____

F-5. Disk diameter 16 or 18 inches. Spacing 7 inches.

F-6. Width of disk in feet 5 ft., 6 ft., 7 ft.

F-7. Type of lubrication Zerk Fittings

F-8. Type of scrapers Full blade

F-9. Disks we propose to furnish under this invitation to bid, deviate from the specification requirements in the following particulars: _____

F-10. It is agreed that in the event deviations are not listed or filed under paragraph 9, above, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature R. E. Seltzer

Title Advertising Mgr.

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant & Operations
Washington, D. C.

September 18, 1939

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 14

Subject: Preparation of Specifications for Equipment. Service Requirements, Technical Provisions, Protests, Performance Records.

To Chiefs of Bureaus and Offices:

General

Government purchase procedure requires that the needs of the Government shall be stated clearly and concisely. The statement establishing the need is known as the Service Requirement and a description of the Technical features required to fulfill the need is referred to as the Technical Provisions. They should be compatible and coextensive.

Theoretically, the use of the technical provisions would be unnecessary, if the needs of the Government could be fully expressed in the service requirements. This, however, in most cases is impractical. Technical provisions are essentially restrictions. ". . . they should not be used except for the purpose of indicating to bidders the general class or type -- not the identity -- of the equipment required . . ."(16 Comp. Gen. 469).

Service Requirements

It has become an established practice for Government Departments to draft specifications which reflect the needs of the Government in terms which permit of full and free competition by all qualified and responsible bidders. Specifications should not be tricky, nor expressed in such terms that only a few favored bidders may be able to meet them. In cases where the needs of the activity concerned can not be satisfied by equipment regularly manufactured by all prospective bidders, the Government has the right to specify its needs, even though the specification may restrict bidding to only one or to a limited few bidders; or require a particular manufacturer to depart from his usual commercial standards in order to manufacture the equipment required under the specifications. The service requirements may sometimes make necessary the purchase and use of a patented or proprietary article because none other will adequately meet the needs of the Government. However, in such cases the requisitioning agency must be able to show upon the basis of facts, and not opinions, that the public needs cannot be adequately met except under the terms of the restrictive specification.

Inaccurate or otherwise insufficient service requirements promote confusion and misunderstanding. It is the responsibility of a bureau to prepare service requirements capable of clear interpretation and common understanding. The service requirements establish the needs of the activity concerned,- the job to be done. The persons best qualified to express in writing the job to be done are the technicians familiar with the actual operations. Service requirements cannot be standardized because they express a particular job to be done under conditions peculiar to a certain environment.

Service requirements should reflect neither a personal or administrative preference nor exaggerate the rigor of service actually required, but instead should accurately express only the real needs of the activity concerned completely and concisely in unequivocal terms.

The following elements are characteristic of a good Service Requirement. As many as are applicable to the work at hand should appear in a statement establishing the needs of the activity concerned.

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., (topography, terrain, altitude, climatic conditions, laboratory, etc.)
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i. e., (size, capacity, accessories, attachments, special features, etc.).
   *b. Unsatisfactory experience with other types of equipment.

* Conclusions of fact may appear in Service Requirements, but the requisitioning agency must have evidence to support conclusions.

Technical Provisions.

Technical specifications are being standardized for many types of equipment by the Technical Advisory Board. In the preparation of a standard specification two conditions are paramount: They shall not be unduly restrictive; they shall, when evaluated in terms of the service requirements, reflect the actual needs of the activity concerned. Usually many weeks are required in the preparation of a standard specification. Copies of the tentative specification are sent to all manufacturers and bureaus with a request for comment and suggestions. The comments are compiled, studied and discussed,- those having general application and merit, finally being incorporated in the specification. Restrictive and ambiguous technical specifications incite protests and consequent delay. This difficulty can be overcome by the preparation of standard specifications by competent engineers specializing in that work, with the cooperation of experienced engineers in the various bureaus and consultation with manufacturers.

It is the responsibility of proper bureau officials to review the technical specifications from the standpoint of completeness and accuracy sufficient to establish the real need of the bureau for a particular type and size of equipment and to determine that the technical specifications, used to further describe the apparatus, prescribe equipment having features capable of fulfilling the need. Since the Technical Advisory Board is charged with the responsibility of approving all technical engineering requirements in specifications employed by the Department, it likewise will determine after a review of the specifications if the technical provisions are restrictive and, if so, if the service requirements substantiate a need for the particular equipment described in the technical provisions, sufficient to warrant its purchase by a restrictive specification.

Protests

Protests may be divided into two general classes. One being that which is based upon stipulations in the specifications which the prospective bidder contends makes the specification unduly restrictive. This kind of protest is usually submitted to the purchasing officer before the bid opening or entered as an exception in his bid at the time of opening. Protests which have merit and are presented before the opening of bids may justify appropriate changes in the specification by addendum.

The second class, protests the award of a contract by an unsuccessful bidder; for any reason whatsoever. Very few protests are made by disgruntled bidders without some cause. Most protests involve honest differences of opinion and in cases where violation of regulations or unjustified discrimination is proved, may be upheld by the Comptroller General.

One of the important duties of the Technical Advisory Board is to forestall protests where possible, by developing standard specifications which are not restrictive; and by approving for use technical specifications which will develop competition, yet assure the securing of equipment capable of fulfilling the service requirements.

Prior to the establishment of the Technical Advisory Board, the Department was receiving about fifty protests each year. During the first year of the Board's operation, they were reduced to a single protest and in that case the Comptroller General sustained the Board's position in the defense of the Department's action.

No one likes a protest. The bidders do not like to make them; the Government does not like to receive them. Not infrequently, a protest of a specification results in considerable delay in the delivery of the equipment and may be the cause of rejection of all bids and postponement of the purchase action.

A review of the published Decisions of the Comptroller General made during the past few years, dealing with protests from low bidders whose bids upon technical equipment had been rejected on the grounds

of non-compliance with the specifications, will reveal that in the majority of the cases the Comptroller General ruled in favor of the protestant. In many of the cases, the specifications set forth certain minimum requirements and the low bidder failed to meet the minimum requirements in one or more particulars. This being the principal reason that the low bids were rejected. The Comptroller General held, in one case that "...where minimum specifications are used, a reasonable deficiency does not justify rejection of an otherwise acceptable low bid, in the absence of facts showing that such minimum specifications reflect a particular need of the Government in a given instance." (16 Comp. Gen. 469)

The Comptroller General has consistently held in connection with the acquisition of automobiles, (would also apply to other types of equipment) that there is no legal authority for the rejection of an otherwise acceptable low bid upon the administrative conclusion that the vehicles offered are not so desirable for the work to be performed as those offered by another bidder.

Very often Departments inject new service requirements into their substantiations of rejection action: that is, introduce a showing of need which did not appear in their original statement of service requirements. Notwithstanding, the Comptroller General has ruled in substance, that where the specifications are silent on a particular service requirement, the requirement cannot be considered later as justification of the Department's rejection action, since bidders were not given complete information as to the work to be performed. This takes us back to the opening statement in this discussion: Namely, that the needs of the Government should be stated clearly and concisely. It should be borne in mind, when writing service requirements and technical specifications, that no subsequent action can be defended on the basis of facts which are not clearly set forth in the service requirements and technical specifications.

It is a mistaken notion to prepare service requirements which overstate or exaggerate the rigor of service actually required. The chance for a bargain offered by a bidder is dependent upon his ability and readiness to supply the equipment meeting the actual needs of the Government at a lower price than his competitor. Since the need of the Government is paramount, it is that need which must justify specifications in every instance. When specifications are drawn so as to set forth fairly and clearly the needs of the Government, the Government is not vitally concerned as to whether one bidder can profitably bid a higher grade article against a cheaper product of another bidder which will adequately perform the work to be done. Manifestly, the Government gains no advantage by magnifying or exaggerating its needs, merely to afford manufacturers of more expensive equipment a better opportunity to compete. When specifications are so drawn, they are restrictive. Therefore, the needs of the Government should not be overstated for the accommodation of any bidder or group of bidders desiring to offer higher priced equipment than is actually needed.

Awards may be made to other than the low bidder only when the equipment offered by the low bidder does not comply with the specification; when it can be definitely established that the low bidder is incompetent or irresponsible; or when experience supported by facts has proven that the use and operation of equipment similar to that offered has fallen short of a reasonable standard of performance in the same or similar type of work stated in the service requirement.

Since the first reason for rejection has been discussed elsewhere, it will not be repeated here. The second reason will not be discussed because it has no direct bearing on the preparation of service requirements and technical specifications. The third reason for rejection is extremely important and one which has always been the cause of much controversy.

Performance Records.

Too often, Departments have attempted to reject the low bid on the basis of unsatisfactory past performance and previous experience, only to find that rejection on that basis was futile because only mere administrative statements were available as to the mal-performance. In many cases, however, rejection of the low bid has been approved and award made to another bidder on the basis of facts showing the purchase of the equipment would not be in the interest of the Government, due to previous unsatisfactory experience in the use of the equipment in performing the same or similar type of work stated in the service requirements. Such action must be based on irrefutable recorded facts and not on administrative opinion.

At the present time the Department does not have any method or procedure for the developing and recording of such facts. Officials in charge of the operation of equipment should report all facts pertaining to the operation of equipment, the performance of which is not considered to be satisfactorily fulfilling service requirements. Such facts should be routed through proper channels in the bureaus to the Technical Advisory Board to be recorded and made available for ready reference to other bureaus in the Department. Bureaus should require periodic reports on the equipment in question in order that information may be accumulated for a period of time long enough to establish a "performance record". The Board will, if necessary, request other bureaus to furnish information on similar equipment.

Performance records should contain only facts; not conclusions or personal opinions. They should be as complete and specific as possible in showing where the equipment in question has fallen short of fulfilling a reasonable standard of performance. A standard of performance is that which reasonably can be expected of the equipment as required by the service and as claimed by bidders, or the performance of other equipment of similar type and comparable class which is or has been operated in the same or similar service. The defense of specification requirements shall be undertaken only upon the basis of facts derived from adequate performance records and the proper application of engineering principles.

Performance records should include all or part of the following elements when applicable:

1. Statement of Service Requirements.
2. Description of Equipment.

Make:	Model:
Size:	Capacity:
P. O. No.	Date of Delivery:

3. Statement of any unusual or peculiar operating conditions.
4. Type of operators and supervision.
5. Availability of service and parts.
6. Service to date in time or units of work.
7. Detailed cost of operation and repair if available.
8. Discussion of points wherein equipment has failed to function properly with comparative figures, when available, on other equipment of similar type and comparable class which is or has been operated in the same or similar service.

TECHNICAL ADVISORY BOARD

Otto Engelmann

Otto Engelmann,
Chairman.

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant & Operations
Washington, D. C.

September 16, 1939

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 15

Subject: Method of submission of service requirements and technical specifications to the Technical Advisory Board for approval before use, in accordance with Secretary's Memorandum #819.

To Chiefs of Bureaus & Offices:

In order to establish a standard and uniform method of submission of service requirements and technical specifications to the Technical Advisory Board for approval prior to issuance by either the Division of Purchase, Sales and Traffic of the Department of Agriculture or the Procurement Division of the Treasury Department, it is requested that the following procedure be observed:

Bureaus will submit service requirements and technical specifications directly to the Technical Advisory Board in duplicate. The Board will retain one copy for its files and return the other copy directly to the bureau with approval or comments on two copies of the Board's approval slip. The Board will assign a case number to the specification which will be indicated on the returned copy and if further correspondence or reference to the specification is necessary with the Technical Advisory Board, the Board's case number should be cited.

When specifications are to be used in connection with bids solicited by the Chief, Division of Purchase, Sales and Traffic, one copy of the Board's approval slip will be attached to the specifications as approved by the Board.

Stencils will be prepared on service requirements and specifications, only <u>after</u> the Board has approved them. At the time of preparation of the stencil, the Board's case number should be placed near the top of the first page of the technical specifications. One copy of the invitation will be forwarded to the Technical Advisory Board at time of issuance.

When specifications are to be used in connection with bids invited by the Procurement Division of the Treasury Department, they will be sent to that Division with the statement that the technical specifications have been approved by the Technical Advisory Board of the Department of Agriculture and with the request that no changes be made therein without prior approval of the requisitioning office. The bureau will secure approval of Technical Advisory Board before authorizing the Procurement Division to make changes in the

specifications. The requisitioning bureau will send one copy of the invitation to the Board for their information and reference. The bureau will affix the Board's case number near the top of Standard Form #33 in order that it may be readily identified by the Board.

It will not be required that prior approval be secured for the use of standard specifications as promulgated by the Technical Advisory Board.

The Board has in its files technical specifications on a great many types of equipment. While they are not standard specifications, they have been approved for use. It is suggested that bureaus consult the Board when developing specifications on equipment with which they may not be entirely familiar and take all possible advantage of the technical work and study already performed and compiled.

It is requested that when bureaus submit their specifications to the Board for approval, they accompany the specifications with a list of prospective bidders known to manufacture a product which will comply with the specifications.

TECHNICAL ADVISORY BOARD

Otto Engelmann

Otto Engelmann,
Chairman.

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

September 22, 1941

TECHNICAL ADVISORY BOARD CIRCULAR NO. 15, SUPPLEMENT NO. 1

Subject: Submission of specifications for review.
(Note: Destroy all copies of supplement dated September 13,1941)

Experience gained through the operations of the Technical Advisory Board since September 16, 1939 indicates the advisability of modifying the procedure outlined in Technical Advisory Board Circular No. 15.

The case files developed by the Board contain technical specifications for practically all types of equipment used in the Department. In many cases the bid dockets have been reviewed and information has been compiled which is available to the Bureaus. Use of this information is offered to obviate the necessity for much of the original market research by the Department units in the preparation of specifications. In addition the Board has at hand much other information which, together with extensive catalogue files, is valuable in the preparation of adequate specifications. Bureaus are urged to feel free to consult with the Board at any time and to take all possible advantage of the technical information already compiled.

Effective October 1, 1941, the following procedure will supersede the instructions contained in memorandum No. 15, September 16, 1939:

Bureaus will submit service requirements and technical specifications directly to the Technical Advisory Board. When unusual commodities or items are the subject of the specifications, the sources of which are not generally known, the specifications as submitted will be accompanied by a list of prospective bidders.

The Board will assign a case number to the submission and this case number should be used to identify any subsequent correspondence with the Board concerning that specification.

When a specification is submitted in duplicate, suggested changes will be entered on both copies and one copy will be returned to the Bureau together with the Board's approval or comments on two copies of the Form P&O 25 "Action Memorandum."

If a Bureau chooses to submit the specification in single copy only, the approval or comments of the Board will be returned to the Bureau on Form P&O 25 "Action Memorandum." The single copy of the specification will be retained by the Board for its files.

When an approved specification is to be used by the Procurement Division in the solicitation of bids for the requisitioning Bureau, one copy of the invitation to bid as issued by the Procurement Division must be sent by the requisitioning Bureau to the Board, showing the Technical Advisory Board case number assigned to the specification.

Specifications once approved by the Board may be reused, provided: that no changes have been made therein; that prior use has proved satisfactory to all concerned; and that the Board shall be notified by Bureau memorandum of its reuse. In each such instance, the requisitioning Bureau must indicate in its specification "Reuse, TAB Case No._____", inserting the case number assigned to the specifications.

No prior approval of the Board is required for the use of a standard specification as promulgated by the Division of Purchase, Sales and Traffic.

Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant & Operations
Washington, D. C.

Technical Advisory Board October 16, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 16

Subject: Report on Automotive Repair Shops

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819, page two, paragraph four, the Technical Advisory Board is continuing the survey of equipment service and repair depots operated by the several bureaus and agencies in the Department for the purpose of effecting, where possible, a consolidation of existing duplication. In order to further this study and to correct and bring up to date data previously collected, it is requested that all bureaus and agencies, now operating such facility, supply additional information.

All repair shops shall be reported in either one of two categories, viz:

Class A - Primary Shop.

A primary shop is defined as one capable of effecting repairs to automotive and heavy construction equipment to the extent of complete rehabilitation.

Class B - Secondary Shops.

A secondary shop is defined as one where all the tasks of routine preventative maintenance are performed upon automotive and construction equipment and including adjustments, tune-up, replacement of parts, repairs to unit assemblies, incidental welding, valve grinding, reseating, and engine overhaul.

Small maintenance or service centers where mechanical repairs are not ordinarily undertaken are not considered shops for the purpose of this survey.

Civilian Conservation Corps camp shops or transient project emergency repair facilities need not be reported.

In case an existing shop may be intermediate between Class A and B as defined, it shall be reported as Class B.

In order to facilitate analysis and compilation, it is requested that the reports be forwarded in duplicate on government standard letter size 8" x 10½" paper.

The agency reporting shall indicate whether a shop is "permanent" or "temporary". If a shop is to be continued for an indefinite time, it shall be reported as "permanent".

It is requested that separate listings of Class A and Class B shops be prepared substantially in the following form:

Bureau_____Class of Shops (A or B)_____Date_____

Location (City or town, County, State)	Permanent or Temporary (P or T)

It is requested that the reports be submitted to the Technical Advisory Board by November 8, 1939.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

November 6, 1939

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 17

Subject: The establishment of Technical Advisory Board auxiliary committees

To Chiefs of Bureaus and Offices:

In conformity with Secretary's Memorandum No. 819, dated May 12, 1939, authorizing the establishment of technical auxiliary committees to assist the Technical Advisory Board in the performance of its responsibilities, there has been established, as result of designations by chiefs of several bureaus, various such committees. The committees and their memberships are shown below:

AUTOMOTIVE EQUIPMENT COMMITTEE

Major Otto Engelmann, Technical Advisory Board, Chairman
Mr. H. R. Jones, Forest Service - Alternate: Mr. D. H. Hamilton
Mr. Samuel B. Andrews, Soil Conservation Service
Mr. Fred L. Hoffman, Bureau of Animal Industry
Mr. A. G. Galloway, Entomology and Plant Quarantine
Mr. Everett H. Burke, Farm Security Administration

Assignment covers all automotive equipment, such as, passenger cars, trucks, trailers, etc.

ELECTRICAL EQUIPMENT COMMITTEE

Mr. C. A. Logan, Technical Advisory Board, Chairman
Mr. H. R. Jones, Forest Service - Alternate: Mr. D.H.Hamilton
Mr. Everett Wilcox, Soil Conservation Service
Mr. A. G. Galloway, Entomology and Plant Quarantine
Mr. Carl O. Hoffman, Farm Security Administration

Assignment covers all electrical equipment (except scientific equipment), such as, electrical prime movers, transformers, generators, resistance apparatus, etc.

FARM EQUIPMENT COMMITTEE

Mr. C. A. Logan, Technical Advisory Board, Chairman
Mr. H. R. Jones, Forest Service - Alternate: Mr. D.H.Hamilton
Mr. Everett Wilcox, Soil Conservation Service
Mr. K. E. Parks, Bureau of Dairy Industry
Mr. John W. Taylor, Bureau of Plant Industry
Mr. E. C. Butterfield, Bureau of Plant Industry
Mr. W. H. White, Entomology and Plant Quarantine

Assignment covers all equipment used in farming operations.

SURVEYING EQUIPMENT COMMITTEE

Mr. Marshall S. Wright, Technical Advisory Board, Chairman
Mr. Samuel B. Andrews, Soil Conservation Service
Mr. W. T. Ellis, Agricultural Adjustment Administration
Mr. H. T. Kelsh, Soil Conservation Service
Mr. Edmund S. Massie, Forest Service
Mr. L.A. Stevens, Weather Bureau

Assignment covers all surveying instruments used for ground surveys to determine distances, areas, elevations, topography hydrography, bearings or azimuths and all drafting equipment used in connection therewith and also all instrumental architectural equipment.

HEAVY CONSTRUCTION EQUIPMENT COMMITTEE

Mr. W. K. Knauff, Technical Advisory Board, Chairman
Mr. H. R. Jones, Forest Service - Alternate Mr. D.H.Hamilton
Mr. Everett Wilcox, Soil Conservation Service
Mr. K. E. Parks, Bureau of Dairy Industry
Mr. A. G. Galloway, Entomology and Plant Quarantine
Mr. W. O. Trone, Farm Security Administration

Assignment covers all heavy construction equipment such as, earthmoving equipment, construction equipment, crushing and pulverizing equipment, pumps, tractors, etc.

PHOTOGRAPHIC EQUIPMENT COMMITTEE

Mr. Marshall S. Wright, Technical Advisory Board, Chairman

STILL AND MOTION PHOTOGRAPHY SUBCOMMITTEE

Mr. George W. Ackerman, Extension Service
Mr. F. M. Blake, Office of Information
Mr. G. R. Goergens, Extension Service
Mr. Reed Haythorne, Soil Conservation Service
Mr. J. A. Hyslop, Entomology and Plant Quarantine
Mr. James Mitchell, Soil Conservation Service
Mr. Walter A. Stenhouse, Bureau of Animal Industry
Mr. Roy Stryker, Farm Security Administration
Mr. R. F. Turnure, Bureau of Plant Industry
Mr. Edmund Massie, Forest Service

Assignment covers all photographic equipment used in the field and laboratory in securing original photography of still and motion scenes indoor or outdoor, or in connection therewith.

PHOTOGRAPHIC EQUIPMENT COMMITTEE
Mr. Marshall S. Wright, Technical Advisory Board, Chairman

AERIAL & PHOTOGRAMMETRIC SUBCOMMITTEE
Mr. Edmund S. Massie, Forest Service
Mr. Mark Baldwin, Bureau of Plant Industry
Mr. H. H. Browne, Bureau of Dairy Industry
Mr. J. A. Hyslop, Entomology and Plant Quarantine
Mr. Ralph Moyer, Agricultural Adjustment Administration
Mr. J. M. Snyder, Soil Conservation Service
Mr. L. A. Woodward, Soil Conservation Service

Assignment covers all equipment used in the procurement of aerial photographs as well as stereo and graphic plotting instruments and equipment used in preparation of planimetric and topographic surveys made in connection therewith.

PHOTOGRAPHIC EQUIPMENT COMMITTEE
Mr. Marshall S. Wright, Technical Advisory Board, Chairman

PHOTOGRAPHIC LABORATORIES
Mr. George W. Ackerman, Extension Service
Mr. F. M. Blake, Office of Information
Mr. Frank M. Goll, Bureau of Plant Industry
Mr. Reed Haythorne, Soil Conservation Service
Mr. J. A. Hyslop, Entomology and Plant Quarantine
Mr. L. W. Kephart, Bureau of Plant Industry
Mr. James Mitchell, Soil Conservation Service
Mr. Grover M. Plew, Agricultural Adjustment Administration
Mr. Walter A. Stenhouse, Bureau of Animal Industry
Mr. Roy Stryker, Farm Security Administration
Mr. L. A. Woodward, Soil Conservation Service
Mr. Edmund S. Massie, Forest Service

Assignment covers all equipment used in Departmental photographic laboratories for processing photographic material and securing photographic reproductions.

SCIENTIFIC EQUIPMENT COMMITTEE
Mr. Marshall S. Wright, Technical Advisory Board, Chairman
Mr. A. H. Mears, Weather Bureau
Mr. John F. Barghausen, Agricultural Marketing Service
Mr. Victor R. Boswell, Bureau of Plant Industry
Mr. H. H. Browne, Bureau of Dairy Industry
Mr. Paul A. Clifford, Food and Drug Administration
Mr. Howard L. Cook, Soil Conservation Service
Mr. Paul E. Howe, Bureau of Animal Industry
Mr. Fred Hoyland, Soil Conservation Service
Mr. Edmund S. Massie, Forest Service
Mr. H. H. McKinney, Bureau of Plant Industry
Mr. Harry W. Schoening, Bureau of Animal Industry
Mr. Charles M. Smith, Entomology and Plant Quarantine

Assignment covers the entire range of scientific instruments used by all Departmental agencies in the field and office conduct of investigations, research and laboratory technique; exclusive of surveying and photographic equipment.

Otto Engelmann
Chairman, Technical Advisory Board

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D.C.

April 16, 1941

TECHNICAL ADVISORY BOARD CIRCULAR No. 17, SUPPLEMENT No. 1.

Subject: The establishment of Technical Advisory Board auxiliary committees.

The following nominations have been submitted by the Chiefs Bureaus and Offices in response to my memorandum of January 17, 1941. The persons named will therefore constitute the Auxiliary Committees of the Technical Advisory Board as indicated.

AUTOMOTIVE EQUIPMENT COMMITTEE

Mr. W. K. Knauff, Technical Advisory Board, Chairman
Mr. Fred L. Hoffman, Bureau of Animal Industry
Mr. R. A. Sheals, Entomology and Plant Quarantine
Mr. W. O. Trone, Farm Security Administration
Mr. H. R. Jones, Forest Service
Mr. P. C. Tuttle, Purchase, Sales and Traffic
Mr. Hugh O'Neale, Plant and Operations
Mr. Charles M. Fergusson, Office of Personnel
Mr. Samuel B. Andrews, Soil Conservation Service

Assignment covers all automotive equipment, such as, passenger cars, trucks, trailers, etc.

FARM EQUIPMENT COMMITTEE

Mr. A. G. Galloway, Technical Advisory Board, Chairman
Mr. C. A. Logan, Beltsville Research Center
Mr. J. R. Dawson, Bureau of Dairy Industry
Mr. W. H. White, Entomology and Plant Quarantine
Mr. W. O. Trone, Farm Security Administration
Mr. D. M. Hamilton, Forest Service
Mr. John W. Taylor, Bureau of Plant Industry
Mr. Oscar Meier, Rural Electrification Administration
Mr. E. C. Butterfield, Bureau of Plant Industry
Mr. P. C. Tuttle, Purchase, Sales and Traffic
Mr. Charles M. Fergusson, Office of Personnel
Mr. Fred A. Hoyland, Soil Conservation Service
Mr. Everett Wilcox, Soil Conservation Service

Assignment covers all equipment used in farming operations.

SURVEYING EQUIPMENT COMMITTEE

Mr. Marshall S. Wright, Technical Advisory Board, Chairman
Mr. Wm. T. Reagan, Agricultural Adjustment Administration
Mr. J. W. Ninneman, Agricultural Adjustment Administration
Mr. W. L. Popham, Entomology and Plant Quarantine
Mr. Carl O. Hoffman, Farm Security Administration
Mr. Edmund S. Massie, Forest Service
Mr. Samuel B. Andrews, Soil Conservation Service
Mr. H. T. Kelsh, Soil Conservation Service
Mr. Fred A. Hoyland, Soil Conservation Service
Mr. Wm. C. Cude, Soil Conservation Service

Assignment covers all surveying instruments used for ground surveys to determine distances, areas, elevations, topography, hydrography, bearings or azimuths and all drafting equipment used in connection therewith and also all instrumental architectural equipment.

HEAVY CONSTRUCTION EQUIPMENT COMMITTEE

Mr. W. K. Knauff, Technical Advisory Board, Chairman
Mr. R. A. Sheals, Entomology and Plant Quarantine
Mr. W. O. Trone, Farm Security Administration
Mr. H. R. Jones, Forest Service
Mr. P. C. Tuttle, Purchase, Sales and Traffic
Mr. Charles, M. Fergusson, Office of Personnel
Mr. Everett Wilcox, Soil Conservation Service

Assignment covers all heavy construction equipment, such as, earthmoving equipment, construction equipment, crushing and pulverizing equipment, pumps, tractors, etc.

PHOTOGRAPHIC EQUIPMENT COMMITTEE

Mr. Marshall S. Wright, Technical Advisory Board, Chairman
Mr. L. Clair Harmon, Agricultural Adjustment Administration
Mr. Lucien B. Wright, Agricultural Adjustment Administration
Mr. Ralph Moyer, Agricultural Adjustment Administration
Mr. Alson H. Wheeler, Agricultural Adjustment Administration
Mr. J. W. Ninneman, Agricultural Adjustment Administration
Mr. Grover M. Plew, Agricultural Adjustment Administration
Mr. W. H. Youngman, Bureau of Agricultural Economics
Mr. Carroll F. Duvall, Agricultural Marketing Service
Mr. Walter A. Stenhouse, Bureau of Animal Industry
Mr. H. H. Browne, Bureau of Dairy Industry
Mr. J. A. Hyslop, Entomology and Plant Quarantine
Mr. Geo. W. Ackerman, Office of Extension Service
Mr. G. R. Goergens, Office of Extension Service
Mr. Roy Stryker, Farm Security Administration
Mr. Stanley Gaines, Federal Crop Insurance Corporation

PHOTOGRAPHIC EQUIPMENT COMMITTEE (continued)

Mr. Edmund S. Massie, Forest Service
Mr. Frank M. Goll, Bureau of Plant Industry
Mr. L. W. Kephart, Bureau of Plant Industry
Mr. Mark Baldwin, Bureau of Plant Industry
Mr. R. F. Turnure, Bureau of Plant Industry
Mr. J. M. Locknane, Purchase, Sales and Traffic
Mr. F. M. Blake, Office of Information
Mr. Fred A. Hoyland, Soil Conservation Service
Mr. Reed Haythorne, Soil Conservation Service
Mr. James Mitchell, Soil Conservation Service
Mr. L. A. Woodward, Soil Conservation Service
Mr. J. M. Snyder, Soil Conservation Service
Dr. Guy R. Stewart, Soil Conservation Service
Mr. Wm. C. Cude, Soil Conservation Service

Assignment covers all photographic equipment used in the field and laboratory in securing original photographs of still and motion scenes, indoor and outdoor or in connection therewith; equipment used in the procurement of aerial photographs as well as stereo and plotting instruments and equipment used in the preparation of planimetric and topographic surveys made in connection therewith; equipment used in Departmental photographic laboratories for processing material and securing photographic reproductions.

SCIENTIFIC EQUIPMENT COMMITTEE

Mr. A. G. Galloway, Technical Advisory Board, Chairman
Mr. Paul Traynham, Agricultural Adjustment Administration
Mr. J. W. Ninneman, Agricultural Adjustment Administration
Dr. D. J. Price, Chemistry and Engineering
Mr. John F. Barghausen, Agricultural Marketing Service
Mr. Clark A. Briggs, Agricultural Marketing Service
Mr. Paul E. Howe, Bureau of Animal Industry
Mr. Harry W. Schoening, Bureau of Animal Industry
Mr. H. H. Browne, Bureau of Dairy Industry
Mr. Charles M. Smith, Entomology and Plant Quarantine
Mr. Perry D. Whittle, Federal Crop Insurance Corporation
Mr. Edmund S. Massie, Forest Service
Mr. Victor R. Boswell, Bureau of Plant Industry
Mr. H. H. McKinney, Bureau of Plant Industry
Mr. Geith Barr, Purchase, Sales and Traffic
Mr. Fred A. Hoyland, Soil Conservation Service
Mr. L. L. Harrold, Soil Conservation Service
Mr. Forrest G. Bell, Soil Conservation Service

Assignment covers the entire range of scientific instruments used by all Departmental agencies in the field and office conduct of investigations, research and laboratory technique; exclusive of surveying and photographic equipment.

AUTOMOTIVE REPAIR SHOP COMMITTEE

Mr. W. K. Knauff, Technical Advisory Board, Chairman
Mr. C. A. Logan, Beltsville Research Center
Dr. Lon. A. Hawkins, Entomology and Plant Quarantine
Mr. Everett H. Burke, Farm Security Administration
Mr. H. R. Jones, Forest Service
Mr. Charles M. Fergusson, Office of Personnel
Mr. G. E. Ryerson, Soil Conservation Service

Assignment covers consultation on problems incident to the establishment, maintenance and operation of repair facilities for the Department of Agriculture.

W. K. Knauff

W. K. Knauff
Chairman, Technical Advisory Board.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

Technical Advisory Board November 24, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 19.

Subject: Tentative Standard Specifications covering Mouldboard Plows, Tractor Drawn.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's Memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering mouldboard plows (A-FMP-631) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A- APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS", and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

In explanation of the method used for designating the mouldboard plow to be procured under the specification, the following example is given: If a bureau desires to purchase a three-wheel tractor-drawn mouldboard plow in the heavy duty class and with four 14" stubble bottoms of soft center steel: with a trash spring and a rear wheel scraper as extra equipment, the invitation to bid should specify as follows:

MOULDBOARD PLOW: Type A-b with four 14" stubble bottoms made of soft center steel, furnished with special equipment D-16e and D-16f; in accordance with the attached United States Department of Agriculture standard specification A-FMP-631.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than December 20, 1939.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
MOULDBOARD PLOWS - TRACTOR DRAWN

(Proposed)

A-FMP-631
November 20 , 1939

D. SPECIFICATIONS

It is the intent of this specification to describe a tractor-drawn mouldboard plow of conventional design and sturdy construction, complete with all operating accessories customarily furnished with mouldboard plows of this type, class and grade whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate not more than 5%, plus or minus, in weight; also other minor deviations may be allowed when such deviations do not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Types of Plows. The plow furnished shall be of the type, and with number, size and type of bottoms, as specified in the invitation to bid.

A. General Purpose.

1. Three wheel plows.
   a. Regular duty (1, 2, 3, 4 and 5 bottoms)
   b. Heavy duty (2,3,4 and 5 bottoms)

2. Two wheel plows (1 and 2 bottoms)

B. Orchard Plow, three wheels, (2, 3 and 4 bottoms)

C. Two-way Plow (2 bottoms only)

D-2. Weight of Plows. The weight of the plow furnished shall be not less than the corresponding weight shown in the table below.

TYPE OF PLOW	NUMBER OF BOTTOMS	SIZE OF BOTTOM 10"	12"	14"	16"	18"
	1	-	-	-	-	700
Field Plows	2	700	800	850	900	950
Three Wheels	3	1000	1100	1150	1200	1300
Regular Duty	4	1400	1450	1500	1550	-
	5	-	1900	2000	2100	-
	2	1500	1550	1600	1650	-
Field Plows	3	1800	1850	1900	1950	-
Three Wheels	4	-	2150	2200	2250	-
Heavy Duty	5	-	2350	2400	2500	-
Field Plows	1	-	-	475	490	500
Two Wheels	2	550	575	600	625	650
Orchard Plows	2	800	850	900	950	-
Three Wheels	3	1100	1150	1200	1250	-
	4	1350	1400	1450	1500	-
Two-Way Plows	2	-	750	800	850	900

D-3 Type and Size of Bottoms. The plow shall be equipped with the type and size of bottoms as specified in the invitation to bid and according to one of the following.

Types	Sizes
General Purpose	10 inch
Stubble	12 inch
Blackland	14 inch
Breaker	16 inch
Slat	18 inch
Chilled	

D-4 Bottom Material . The bottom shall be made of the material as specified in the invitation to bid: chilled iron, soft-center steel or solid steel.

D-5. Frame and beam. The frame and beams shall be of sufficiently rugged design to prevent warping, twisiting or breakage under severe service conditions. The beams shall be of heat treated steel.

D-6. Depth Control and Leveling Devices. The plow shall be equipped with a simple but adequate means for controlling depth and leveling the plow, operated by either cranks and screws or levers, and with assisting springs. A simple means shall be incorporated for adjusting the rear wheel on three wheel plows to compensate for variations in vertical and horizontal suction. When levers are used on orchard plows, they shall be arranged so as to avoid contact with overhanging branches. All levers and screws should be located to permit

easy operation from tractor seat. The rear furrow wheel of Type A1 plows should be locked to its work when plow is in ground, but provision shall be made for it to castor when plow is in transport position.

D-7. Power Lift. The plow shall be equipped with a positive action power-lift, controlled from the driver's seat. Two-way plows shall have an individual power lift for each bottom. The power lift device shall be enclosed and its parts made of a wear resistant material.

D-8. Bearings. Wheel and disk bearings shall be of the replaceable type, made of chilled iron and dust proof. They shall be designed to carry all loads that may be imposed upon them under severe operating conditions.

D-9. Tractor Hitch. The plow shall be equipped with a hitch adaptable to all farm type tractors. It shall have a means for horizontal and vertical adjustment with spring-trip hitch to prevent damage to the plow when striking underground obstructions.

D-10. Clearance. There shall be ample clearance under the beams and between bottoms to prevent clogging with trash. When bottoms are in an elevated position, there shall be ample clearance between ground and bottoms to facilitate transporting.

D-11 Rolling Coulter and Jointer. The plow shall be equipped with a combination fifteen inch, full blade rolling coulter and jointer unless otherwise specified. The coulter shall be of tough, abrasion resistant, high grade steel, carefully heat treated, either electrically or oil tempered, after forming.

D-12. Orchard Plows. A narrow wheel base is required on all Type B plows to permit rear bottoms to be worked as close to trees as possible.

D-13. Lubrication. All types of plows shall have adequate means of lubrication of all moving parts, with fittings for pressure lubrication of all bearings.

D-14 Paint. All plows shall be adequately covered with a weatherproof paint of manufacturer's standard production color, unless otherwise specified.

D-15 Accessories. All plows shall be equipped with all necessary tools and appliances of recognized quality, sufficient to accomplish all periodic lubrication, field adjustments, emergency repairs and ordinary preventative maintenance. One instruction book and repair parts list shall be furnished with each plow.

D-16 Special Equipment. When specified in the invitation to bid, the following special equipment shall be furnished:

D-16a. Rolling coulter, full blade, 18 inch
D-16b. Rolling coulter, serrated blade, 18 inch
D-16c. Rolling coulter, serrated blade, 15 inch
D-16d. Knife coulter
D-16e. Trash spring
D-16f. Rear wheel scraper
D-16g. Mouldboard extension

E. TEST REQUIREMENTS

When standard production units are furnished under this specification, no tests will be required, unless otherwise specified.

F. QUESTIONNAIRE

Bids must be accompanied by the following questionnaire fully completed by the bidder:

F-1. Model number _____

F-2. Weight of plow as bid, but without special equipment _____ lbs.

F-3. Shipping weight, complete _____ lbs.

F-4. Type of bearings _____

F-5. Number of bottoms _____ Type of bottoms _____

Size of bottoms _____ inches. Material of bottoms _____

F-6. Type of lubrication _____

F-7. Is plow hitch adaptable to all tractors? _____

F-8. Clearance between under side of beam and point of share _____ inches

F-9. Fore-and-aft spacing of bottoms _____ inches.

F-10. Clearance between bottoms and ground when plow is in transport position _____ inches.

F-11. The plow we propose to furnish under this invitation to bid, deviates from the specification requirements in the following particulars:

_____

_____

_____

_____

F-12. It is agreed that in the event deviations are not listed or filed under paragraph F-11, above, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
MOULDBOARD PLOWS - TRACTOR DRAWN

(Proposed)

A-FMP-631
November 20 , 1939

D. SPECIFICATIONS

It is the intent of this specification to describe a tractor-drawn mouldboard plow of conventional design and sturdy construction, complete with all operating accessories customarily furnished with mouldboard plows of this type, class and grade whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate not more than 5%, plus or minus, in weight; also other minor deviations may be allowed when such deviations do not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Types of Plows. The plow furnished shall be of the type, and with number, size and type of bottoms, as specified in the invitation to bid.

A. General Purpose.

1. Three wheel plows.
   a. Regular duty (1, 2, 3, 4 and 5 bottoms)
   b. Heavy duty (2,3,4 and 5 bottoms)

2. Two wheel plows (1 and 2 bottoms)

B. Orchard Plow, three wheels, (2, 3 and 4 bottoms)

C. Two-way Plow (2 bottoms only)

D-2. Weight of Plows. The weight of the plow furnished shall be not less than the corresponding weight shown in the table below.

TYPE OF PLOW	NUMBER OF BOTTOMS	SIZE OF BOTTOM 10"	12"	14"	16"	18"
	1	-	-	-	-	700
Field Plows	2	700	800	850	900	950
Three Wheels	3	1000	1100	1150	1200	1300
Regular Duty	4	1400	1450	1500	1550	-
	5	-	1900	2000	2100	-
	2	1500	1550	1600	1650	-
Field Plows	3	1800	1850	1900	1950	-
Three Wheels	4	-	2150	2200	2250	-
Heavy Duty	5	-	2350	2400	2500	-
Field Plows	1	-	-	475	490	500
Two Wheels	2	550	575	600	625	650
Orchard Plows	2	800	850	900	950	-
Three Wheels	3	1100	1150	1200	1250	-
	4	1350	1400	1450	1500	-
Two-Way Plows	2	-	750	800	850	900

D-3 Type and Size of Bottoms. The plow shall be equipped with the type and size of bottoms as specified in the invitation to bid and according to one of the following.

Types	Sizes
General Purpose	10 inch
Stubble	12 inch
Blackland	14 inch
Breaker	16 inch
Slat	18 inch
Chilled	

D-4 Bottom Material . The bottom shall be made of the material as specified in the invitation to bid: chilled iron, soft-center steel or solid steel.

D-5. Frame and beam. The frame and beams shall be of sufficiently rugged design to prevent warping, twisiting or breakage under severe service conditions. The beams shall be of heat treated steel.

D-6. Depth Control and Leveling Devices. The plow shall be equipped with a simple but adequate means for controlling depth and leveling the plow, operated by either cranks and screws or levers, and with assisting springs. A simple means shall be incorporated for adjusting the rear wheel on three wheel plows to compensate for variations in vertical and horizontal suction. When levers are used on orchard plows, they shall be arranged so as to avoid contact with overhanging branches. All levers and screws should be located to permit

easy operation from tractor seat. The rear furrow wheel of Type A1 plows should be locked to its work when plow is in ground, but provision shall be made for it to castor when plow is in transport position.

D-7. Power Lift. The plow shall be equipped with a positive action power-lift, controlled from the driver's seat. Two-way plows shall have an individual power lift for each bottom. The power lift device shall be enclosed and its parts made of a wear resistant material.

D-8. Bearings. Wheel and disk bearings shall be of the replaceable type, made of chilled iron and dust proof. They shall be designed to carry all loads that may be imposed upon them under severe operating conditions.

D-9. Tractor Hitch. The plow shall be equipped with a hitch adaptable to all farm type tractors. It shall have a means for horizontal and vertical adjustment with spring-trip hitch to prevent damage to the plow when striking underground obstructions.

D-10. Clearance. There shall be ample clearance under the beams and between bottoms to prevent clogging with trash. When bottoms are in an elevated position, there shall be ample clearance between ground and bottoms to facilitate transporting.

D-11 Rolling Coulter and Jointer. The plow shall be equipped with a combination fifteen inch, full blade rolling coulter and jointer unless otherwise specified. The coulter shall be of tough, abrasion resistant, high grade steel, carefully heat treated, either electrically or oil tempered, after forming.

D-12. Orchard Plows. A narrow wheel base is required on all Type B plows to permit rear bottoms to be worked as close to trees as possible.

D-13. Lubrication. All types of plows shall have adequate means of lubrication of all moving parts, with fittings for pressure lubrication of all bearings.

D-14 Paint. All plows shall be adequately covered with a weatherproof paint of manufacturer's standard production color, unless otherwise specified.

D-15 Accessories. All plows shall be equipped with all necessary tools and appliances of recognized quality, sufficient to accomplish all periodic lubrication, field adjustments, emergency repairs and ordinary preventative maintenance. One instruction book and repair parts list shall be furnished with each plow.

D-16 Special Equipment. When specified in the invitation to bid, the following special equipment shall be furnished:

D-16a. Rolling coulter, full blade, 18 inch
D-16b. Rolling coulter, serrated blade, 18 inch
D-16c. Rolling coulter, serrated blade, 15 inch
D-16d. Knife coulter
D-16e. Trash spring
D-16f. Rear wheel scraper
D-16g. Mouldboard extension

E. TEST REQUIREMENTS

When standard production units are furnished under this specification, no tests will be required, unless otherwise specified.

F. QUESTIONNAIRE

Bids must be accompanied by the following questionnaire fully completed by the bidder:

F-1. Model number _____

F-2. Weight of plow as bid, but without special equipment _____ lbs.

F-3. Shipping weight, complete _____ lbs.

F-4. Type of bearings _____

F-5. Number of bottoms _____ Type of bottoms _____

Size of bottoms _____ inches. Material of bottoms _____

F-6. Type of lubrication _____

F-7. Is plow hitch adaptable to all tractors? _____

F-8. Clearance between under side of beam and point of share _____ inches

F-9. Fore-and-aft spacing of bottoms _____ inches.

F-10. Clearance between bottoms and ground when plow is in transport position _____ inches.

F-11. The plow we propose to furnish under this invitation to bid, deviates from the specification requirements in the following particulars:

_____

_____

_____

_____

F-12. It is agreed that in the event deviations are not listed or filed under paragraph F-11, above, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

Technical Advisory Board November 24, 1939

TECHNICAL ADVISORY BOARD CIRCULAR NO. 20

Subject: Tentative Standard Specifications covering Garden Tractors.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering garden tractors (A-FGT-671) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS", and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Due to the fact that tread widths and tread adjustments vary radically on garden tractors of different manufacturer, it is not only impractical but impossible to specify, in the technical provisions, a tread width or tread variation for each class of tractor. It is also found to be unsatisfactory to list under D-16 items of special equipment, such as tools and attachments in a manner similar to other

standard specifications, due largely to the fact that while nearly all manufacturers offer the standard and commonly used tools and attachments, there are so many different sizes, types and kinds which, if listed, would be likely to confuse the bidders as well as the requisitioning bureau. It was determined, therefore, that when this specification is used, bureaus should state in their service requirements and also in the invitation to bid, the tread width and tread variation required. Also, that the bureau should describe in the invitation to bid, just what tools, attachments and special equipment are necessary to successfully meet the service requirements.

In explanation of the method used for designating the garden tractor to be procured under this specification, the following example is given: If a bureau desires to purchase a two-wheel garden tractor in the four horsepower class, complete with one 8" mouldboard plow and rolling coulter, disk harrow and spike tooth harrow, and if the service requires a tread variation of from approximately 16" to 22", the invitation to bid should specify as follows:

> GARDEN TRACTOR: Class T-4R, with tread variation of from approximately 16" to 22" complete with 8" mouldboard plow, disk harrow and spike tooth harrow; in accordance with attached U. S. Department of Agriculture standard specification A-FGT-671.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than December 20, 1939.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
GARDEN TRACTORS
(One and Two Wheel Types)

A-FGT-671
(Proposed) November 20, 1939

D. SPECIFICATIONS

It is the intent of this specification to describe a garden tractor of conventional design and sturdy construction, complete with all operating accessories customarily furnished with garden tractors of this type and class, whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate not more than 5%, plus or minus, in weight; also other minor deviations may be allowed when such deviations do not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Types and Classes. Garden tractors shall be furnished in the following types and classes and shall at least fulfill the minimum requirements of the classification specified in the invitation to bid:

D-1a. Minimum requirements of Two Wheel Type.

Class T	Engine H.P.	Weight lbs.	Ground Clearance Regular (inches)	Ground Clearance High (inches)
T-2R	2	450	12	
T-2H	2	450		18
T-3R	3	475	15	
T-3H	3	475		18
T-4R	4	500	18	
T-5R	5	550	18	

D-1b. Minimum requirements of One Wheel Type.

Class O	Engine H.P.	Weight (lbs.)
O-2	2	200

D-1c. Engine Horse-power. The horse-power of engine furnished shall be not less than that specified in D-1a, measured at the manufacturer's recommended operating speed.

D-1d. Weight. The weight of the garden tractor furnished shall be not less than that specified in D-1a and shall be the actual weight of a standard unit in operating condition with standard equipment, exclusive of water, fuel and any special equipment or attachments.

D-2. Frame. The frame and structural supporting members shall be of reinforced construction, and shall be capable of withstanding severe service conditions without breakage or deformation. Component and related parts shall be accurately and permanently aligned. Assembled machines shall have adequate rigidity and shall be free from excessive vibration when in operation.

D-3. Engine. The engine shall be the manufacturer's standard current production model; internal combustion, 4 cycle type; either single, twin or multiple cylinder, using gasoline as fuel. It shall have adequate reserve power to operate the tractor satisfactorily under temporary overload conditions and shall be capable or operating continuously for 8 hours daily, except for intervals required for refueling, under the conditions and operating speeds hereinafter specified.

D-3a. Water-Cooled Engines. Water-cooled engines shall be equipped with an efficient automobile-type radiator and power-driven fan.

D-3b. Air Cleaner. The engine shall be equipped with an efficient air cleaner which may be removed for cleaning.

D-3c. Fuel System. The engine shall be equipped with a float-type carburetor and fuel tank with a capacity for at least four hours operation of the tractor.

D-3d. Ignition System. The ignition system shall have a suitable high tension magneto with impulse coupling.

D-3e. Muffler. The engine shall be equipped with an efficient exhaust muffler or silencer.

D-3f. Starter. The engine starter may be either of the hand-crank or hand-lever type which shall be automatically released when the engine starts.

D-3g. Crankshaft. The crankshaft shall be enclosed in an oil-tight housing and supported on either sleeve, ball or roller bearings of ample size.

D-3h. Lubrication. Engine lubrication shall be effected by either an oil pump or oil slinger to circulate or distribute the crankcase oil. The engine shall be equipped with either an oil-level rod, a metal protected glass gauge or other suitable means of visual inspection of the oil level in the crank case.

D-4. Tread Width and Tread Adjustment. The tractor shall be furnished with the tread width and tread adjustment as specified in the invitation to bid and to meet service requirements.

D-5. Operating Speed. The operating speed on Class T-2, T-3 and O-2 tractors shall be readily varied over a range of from approximately 1/2 to 2-1/2 miles per hour, controlled either by a throttle, an automatic or manually adjustable speed governor, gear shift transmission or a combination thereof.

The operating speed on Class T-4 and T-5 tractors shall be readily varied over a range of from approximately 1/2 to 3 miles per hour by means of a gear shift transmission.

D-6. Clutches. Clutches shall be substantially constructed to withstand severe operating service. The clutch lining material shall be replaceable.

D-7. Controls. Handle grip and lever controls shall be positive in action and shall remain locked or fixed in any required position under all operating conditions.

D-8. Handle Frame. The handle frame shall be sufficiently rigid to prevent whipping action or noticeable deformation when tractor is manipulated on turns. The handle frame may be made of either a straight grain hardwood or steel.

D-9. Lubrication. Gears and bearings shall be accessible for lubrication, except ball or roller bearings which shall be packed in grease and sealed. Lubrication points shall be equipped with fittings for pressure lubrication.

D-10. Power Drive. Power for operating the wheels shall be transmitted from the engine either by means of roller chains and sprockets, gear shafts and gears or V-belt and pulleys. Teeth of gears shall be machine cut. Sprocket teeth shall be either machine cut or accurately cast to size. Gears shall be completely enclosed in an oil or grease filled housing.

D-11 Turning. Provision shall be made for the application of power from the engine to aid in turning all tractors except the O-2 class.

D-12. Paint. All surfaces exposed to the weather, other than corrosion resistant polished metal surfaces or trim, shall be suitably primed, under coated and finish painted in manufacturer's standard color.

D-13. Power Take-off. The tractor shall be equipped with a power take-off connection.

D-14. Rubber Tires. Unless otherwise specified in the invitation to bid, the tractor shall be equipped with agricultural type, low pressure, pneumatic tires. They shall be of ample size and capacity to carry the load imposed upon them in accordance with the current recommendations of the Tire and Rim Association.

D-15. Tools. The tractor shall be equipped with a complement of tools and appliances of recognized quality sufficient to accomplish all periodic lubrication, ordinary field adjustments, emergency repair and ordinary preventative maintenance. There shall also be furnished, complete instructions pertaining to the operation, lubrication, adjustment and care of the tractor and attachments, together with a parts list.

D-16. Special Equipment and Attachments. When and as specified in the invitation to bid, special equipment, tools and attachments shall be furnished. They shall be furnished complete, ready for work with the tractor with lift, depth control and carriage or gauge wheels, etc., as may be necessary for efficient operation.

E. TESTS

When standard production units are furnished, no tests will be required unless otherwise specified in the invitation to bid.

F. QUESTIONNAIRE

Bids must be accompanied by the following questionnaire fully completed by the bidder.

F-1. Make of tractor _____ Model _____

F-2. Weight of tractor (See D-1d) _____ lbs.

F-3. Shipping weight complete _____ lbs.

F-4. Make of engine _____ Model _____

F-5. Horse-power of engine at manufacturer's recommended speed _____

F-6. Manufacturer's recommended speed _____ R.P.M.

F-7. Method of starting (See D-3f) _____

F-8. Type of ignition _____

F-9. Air cleaner: Make _____ Model _____

F-10. Make of carburetor _____ Model _____

F-11. Method of engine lubrication (See D-3h) _____

F-12. Type of external lubrication (See D-9) _____

F-13. Tire size _____

F-14. Belt Pulley: RPM _____ Diameter _____ Face _____

F-15. Method of application of power to aid in turning _____

_____

_____

F-16. Method of power transmission to wheels (See D-10)_____

F-17. Method of cooling engine_____

F-18. The tractor we propose to furnish under this invitation to bid deviates from the specification requirements in the following particulars: ____

_____

_____

_____

F-19. It is agreed that in the event deviations are not listed or filed under paragraph F-17 above, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
GARDEN TRACTORS
(One and Two Wheel Types)

A-FGT-671
(Proposed) November 20, 1939

D. SPECIFICATIONS

It is the intent of this specification to describe a garden tractor of conventional design and sturdy construction, complete with all operating accessories customarily furnished with garden tractors of this type and class, whether herein stipulated or not, together with such modifications and attachments as may be essential to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are intended to describe and define a class or group of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate not more than 5%, plus or minus, in weight; also other minor deviations may be allowed when such deviations do not reduce its capacity, diminish its structural strength and ruggedness, or in any manner curtail the ability of the unit to perform the work upon an equal basis and with comparable efficiency with competitive units in its class.

D-1. Types and Classes. Garden tractors shall be furnished in the following types and classes and shall at least fulfill the minimum requirements of the classification specified in the invitation to bid:

D-1a. Minimum requirements of Two Wheel Type.

Class T	Engine H.P.	Weight lbs.	Ground Clearance Regular (inches)	Ground Clearance High (inches)
T-2R	2	450	12	
T-2H	2	450		18
T-3R	3	475	15	
T-3H	3	475		18
T-4R	4	500	18	
T-5R	5	550	18	

D-1b. Minimum requirements of One Wheel Type.

Class O	Engine H.P.	Weight (lbs.)
O-2	2	200

D-1c. Engine Horse-power. The horse-power of engine furnished shall be not less than that specified in D-1a, measured at the manufacturer's recommended operating speed.

D-1d. Weight. The weight of the garden tractor furnished shall be not less than that specified in D-1a and shall be the actual weight of a standard unit in operating condition with standard equipment, exclusive of water, fuel and any special equipment or attachments.

D-2. Frame. The frame and structural supporting members shall be of reinforced construction, and shall be capable of withstanding severe service conditions without breakage or deformation. Component and related parts shall be accurately and permanently aligned. Assembled machines shall have adequate rigidity and shall be free from excessive vibration when in operation.

D-3. Engine. The engine shall be the manufacturer's standard current production model; internal combustion, 4 cycle type; either single, twin or multiple cylinder, using gasoline as fuel. It shall have adequate reserve power to operate the tractor satisfactorily under temporary overload conditions and shall be capable or operating continuously for 8 hours daily, except for intervals required for refueling, under the conditions and operating speeds hereinafter specified.

D-3a. Water-Cooled Engines. Water-cooled engines shall be equipped with an efficient automobile-type radiator and power-driven fan.

D-3b. Air Cleaner. The engine shall be equipped with an efficient air cleaner which may be removed for cleaning.

D-3c. Fuel System. The engine shall be equipped with a float-type carburetor and fuel tank with a capacity for at least four hours operation of the tractor.

D-3d. Ignition System. The ignition system shall have a suitable high tension magneto with impulse coupling.

D-3e. Muffler. The engine shall be equipped with an efficient exhaust muffler or silencer.

D-3f. Starter. The engine starter may be either of the hand-crank or hand-lever type which shall be automatically released when the engine starts.

D-3g. Crankshaft. The crankshaft shall be enclosed in an oil-tight housing and supported on either sleeve, ball or roller bearings of ample size.

D-3h. Lubrication. Engine lubrication shall be effected by either an oil pump or oil slinger to circulate or distribute the crankcase oil. The engine shall be equipped with either an oil-level rod, a metal protected glass gauge or other suitable means of visual inspection of the oil level in the crank case.

D-4. Tread Width and Tread Adjustment. The tractor shall be furnished with the tread width and tread adjustment as specified in the invitation to bid and to meet service requirements.

D-5. Operating Speed. The operating speed on Class T-2, T-3 and O-2 tractors shall be readily varied over a range of from approximately 1/2 to 2-1/2 miles per hour, controlled either by a throttle, an automatic or manually adjustable speed governor, gear shift transmission or a combination thereof.

The operating speed on Class T-4 and T-5 tractors shall be readily varied over a range of from approximately 1/2 to 3 miles per hour by means of a gear shift transmission.

D-6. Clutches. Clutches shall be substantially constructed to withstand severe operating service. The clutch lining material shall be replaceable.

D-7. Controls. Handle grip and lever controls shall be positive in action and shall remain locked or fixed in any required position under all operating conditions.

D-8. Handle Frame. The handle frame shall be sufficiently rigid to prevent whipping action or noticeable deformation when tractor is manipulated on turns. The handle frame may be made of either a straight grain hardwood or steel.

D-9. Lubrication. Gears and bearings shall be accessible for lubrication, except ball or roller bearings which shall be packed in grease and sealed. Lubrication points shall be equipped with fittings for pressure lubrication.

D-10. Power Drive. Power for operating the wheels shall be transmitted from the engine either by means of roller chains and sprockets, gear shafts and gears or V-belt and pulleys. Teeth of gears shall be machine cut. Sprocket teeth shall be either machine cut or accurately cast to size. Gears shall be completely enclosed in an oil or grease filled housing.

D-11 Turning. Provision shall be made for the application of power from the engine to aid in turning all tractors except the O-2 class.

D-12. Paint. All surfaces exposed to the weather, other than corrosion resistant polished metal surfaces or trim, shall be suitably primed, under coated and finish painted in manufacturer's standard color.

D-13. Power Take-off. The tractor shall be equipped with a power take-off connection.

D-14. Rubber Tires. Unless otherwise specified in the invitation to bid, the tractor shall be equipped with agricultural type, low pressure, pneumatic tires. They shall be of ample size and capacity to carry the load imposed upon them in accordance with the current recommendations of the Tire and Rim Association.

D-15. Tools. The tractor shall be equipped with a complement of tools and appliances of recognized quality sufficient to accomplish all periodic lubrication, ordinary field adjustments, emergency repair and ordinary preventative maintenance. There shall also be furnished, complete instructions pertaining to the operation, lubrication, adjustment and care of the tractor and attachments, together with a parts list.

D-16. Special Equipment and Attachments. When and as specified in the invitation to bid, special equipment, tools and attachments shall be furnished. They shall be furnished complete, ready for work with the tractor with lift, depth control and carriage or gauge wheels, etc., as may be necessary for efficient operation.

E. TESTS

When standard production units are furnished, no tests will be required unless otherwise specified in the invitation to bid.

F. QUESTIONNAIRE

Bids must be accompanied by the following questionnaire fully completed by the bidder.

F-1. Make of tractor _____ Model _____

F-2. Weight of tractor (See D-1d) _____ lbs.

F-3. Shipping weight complete _____ lbs.

F-4. Make of engine _____ Model _____

F-5. Horse-power of engine at manufacturer's recommended speed _____

F-6. Manufacturer's recommended speed _____ R.P.M.

F-7. Method of starting (See D-3f) _____

F-8. Type of ignition _____

F-9. Air cleaner: Make _____ Model _____

F-10. Make of carburetor _____ Model _____

F-11. Method of engine lubrication (See D-3h) _____

F-12. Type of external lubrication (See D-9) _____

F-13. Tire size _____

F-14. Belt Pulley: RPM _____ Diameter _____ Face _____

F-15. Method of application of power to aid in turning _____

_____

_____

F-16. Method of power transmission to wheels (See D-10)_____

F-17. Method of cooling engine_____

F-18. The tractor we propose to furnish under this invitation to bid deviates from the specification requirements in the following particulars: ____

_____

_____

_____

F-19. It is agreed that in the event deviations are not listed or filed under paragraph F-17 above, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

December 16, 1939

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 21

Subject: Review of Specifications by Committee Members.

To All Committee Members of the Technical Advisory Board:

To expedite the clearance of specifications currently being submitted to the Technical Advisory Board and which in many cases have had to be returned to the originating Bureau for lack of compliance with the requirements of Circulars Nos. 14 and 15, particularly in regard to the inclusion of service requirements and lists of prospective bidders, it is believed advisable to have all this material previously reviewed within the Bureau by the designated committee member or members.

It is suggested that you arrange to insure that all specifications prepared in your Bureau covering equipment coming within the province of committees of which you are a member, are reviewed before being sent to the Technical Advisory Board. This should be indicated by initialing the carbon copy of the specifications which is submitted to and retained by the Board.

I wish to emphasize that your review will not entail any responsibility for the adequacy of service requirements or the accuracy of technical provisions, but is merely for the purpose of standardizing and coordinating the proper form of presentation, and to familiarize you, as a committee member, with the needs of your Bureau and also furnish sufficient knowledge of repeated and current requirements to assist you in the determination as to the necessity and/or desirability of preparing standard Departmental specifications.

Otto Engelmann

Otto Engelmann,
Chairman, Technical Advisory Board

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

December 16, 1939

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 22

Subject: Tentative Standard Specifications covering Concrete Mixers, Trailer Mounted.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering concrete mixers, trailer mounted (A-CM-T-701) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS" and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than January 20, 1940.

Otto Engelmann
Chairman, Technical Advisory Board

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
Concrete Mixers, Trailer Mounted
Sizes $3\frac{1}{2}$S, 5S, 7S, 10S, 14S

(Proposed)

December 18, 1939
Spec. A-CM-T-701

D. SPECIFICATIONS

It is the intent of this specification to describe power operated concrete mixers of the single-compartment one-opening drum or the single-compartment two-opening drum type, mounted as self-contained units upon two or four wheel trailers, all of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with concrete mixers of this type whether herein stipulated or not, together with appurtenances and attachments as may be stated in the invitation which are necessary to enable the unit to fulfill the service requirements. The right is reserved to accept units offered in response to this specification which deviate in a minor degree from any single requirement provided that the unit is otherwise in substantial accordance with the specification and that such deviation does not reduce its capacity, detract from its structural strength and ruggedness or in any manner impair the ability of the unit to perform the work required upon an equal basis and with comparable facility and efficiency with competitive units in its class.

D-1. Types. Each concrete mixer shall be furnished with a single rotating drum arranged to operate as follows:

Tilting: The rotating drum shall be capable of being tilted mechanically from a charging position to a discharging position.

Non-tilting: The position of the rotating drum shall be fixed and non-tilting; charging and discharging being accomplished through an appropriate opening in each head of the drum.

D-2. Size and Capacity. Concrete mixers shall be furnished in any one of five sizes, designated as follows:

(a) $3\frac{1}{2}$-S
(b) 5-S
(c) 7-S
*(d) 10-S
*(e) 14-S

The size designations and the corresponding capacities of the concrete mixers furnished shall be in accordance with the current Concrete Mixer Standards adopted by the Mixer Manufacturers' Bureau of the Associated General Contractors of America, Inc.

* Bureaus should ascertain available types of mountings on 10-S and 14-S before specifying.

D-3. Classes. Tilting and non-tilting type concrete mixers shall be furnished with the following types of mountings and as specified in the invitation to bid:

Side Discharge: The rotating drum shall be located so as to discharge the mixed concrete from the side of the trailer.

End Discharge: The rotating drum shall be located so as to discharge the mixed concrete from the end of the trailer.

D-4. Trailer. The concrete mixer shall be assembled as a mobile unit, mounted upon either a two or a four wheel trailer as specified in the invitation to bid.

D-4a. Frame. The trailer shall be of adequate design with sturdy frame composed of structural steel shapes fabricated in accordance with recognized standards. It shall be spring mounted upon the axles to permit of rapid towing without damage, and the whole assembly shall be strong enough to resist all stresses imposed through operation and transportation of the mixer.

D-4b. Tow-pole or Tongue. The trailer shall be equipped with a sturdy tow-pole or tongue fitted with a swiveling clevis or equivalent device suitable for attachment to the towing vehicle. The tow-pole or tongue shall be telescoping or otherwise suitably arranged for stowing while not in use, so as not to interfere with the operation in and about the mixer while working.

D-4c. Jacks. The trailer shall be equipped with such standards, jacks or ground supports as may be necessary to provide support and stability to the mixer while operating.

D-4d. Wheels. Wheels shall be of the all steel spoke or automotive type, equipped with anti-friction bearings and adequate means for lubrication. They shall be fitted with flat steel rims, solid rubber or pneumatic tires as specified in the invitation to bid. When pneumatic tires are furnished, the size shall be sufficient to carry the full weight of the unit, including batch, in accordance with the standards of the Tire and Rim Manufacturers' Association.

D-5. Mixing Drum, Tilting Type. The mixing drum shall be sturdily constructed of abrasion resistant steel fitted with ball or roller bearings effectively sealed to exclude dirt or abrasives and shall be provided with adequate means for adjustment and lubrication. It shall revolve under full load, at the most efficient mixing speed.

D-5a. Tilting Mechanism. The tilting mechanism shall be geared and provided with a device to automatically hold the drum in any operating position.

D-5b. Mixing Blades. The drum shall be equipped with sufficient high grade, abrasion resistant steel mixing blades to insure thorough mixing and clean, rapid discharge of the batch.

D-5c. Spout. The drum opening or spout shall be of adequate size and shall be effectively reinforced to withstand rough usage.

D-6. Mixing Drum, Nontilting Type. The mixing drum shall be sturdily constructed of abrasion resistant steel and the metal in the drum heads and the drum shell shall be the heaviest gauge used commercially in the several sizes. It shall revolve, under full load, at the most efficient mixing speed. The method of attachment of the drum head to the drum shell shall be in accordance with the best commercial practice.

D-6a. Drum Rollers. The drum rollers shall be of chilled or pressed steel, equally wear resistant, accurately formed and shall be mounted upon roller or ball bearings suitably sealed to exclude abrasives and fitted with means for lubrication.

D-6b. Mixing Blades. The drum shall be equipped with the optimum number of mixing blades and buckets to insure a thorough mixing and clean rapid discharge of the batch.

D-7. Charging Skip. A power operated charging skip shall be furnished with all sizes of mixers except the size 3½-S tilting drum type, but may be required for this size when so specified in the invitation to bid.

D-7a. Skip Hoist and Clutch. The skip shall be sturdily constructed and shall be operated by a suitable hoist equipped with an adjustable clutch and be provided with a dependable device to automatically release the clutch and apply the brake when the skip has reached the uppermost limit of its charging position.

D-7b. Skip Shaking Device. The skip shall be furnished with a dependable and effective device to automatically shake the skip as it reaches the charging position.

D-7c. Skip Reinforcing. The lip and the closed end of the skip shall be adequately reinforced to withstand the bumping of wheel barrows.

D-7d. Skip Hoisting Cable. The hoisting cable shall be attached to the skip in such a manner that the stress in each part shall be the same and self-equalizing.

D-8. Water Measuring Tank. A water measuring tank shall be furnished with all sizes and mixers except the size 3½-S tilting drum type, but may be required for this size when so stated in the invitation to bid. The tank shall be of the pressure type, capable of accurately controlling the quantity of water delivered to each batch. Its capacity, fittings, and connections shall be in accordance with the provisions of the Concrete Mixer Standards of the Associated General Contractors of America.

D-9. Control Mechanism. All operating and control levers shall be within easy and convenient reach of the operator when standing in operating position.

D-10. Power Unit. The power unit shall be complete and self-contained, fully enclosed and mounted so as to be readily accessible for adjustment and repair. The enclosure shall be fitted with a suitable means for locking.

D-10a. Engine. The engine shall be of the internal combustion, four cycle type, using gasoline as a fuel and shall be furnished complete with all necessary operating accessories, including a moisture proof high-tension magneto with impulse coupling, governor and oil bath air cleaner. It shall be capable of supplying all of the power necessary to operate the mixer under all operating conditions continuously without evidence of overload. It shall develop its full rated power at a governed speed of approximately 1200 r.p.m.

D-10b. Clutch and Transmission. The power unit shall be furnished with a substantial clutch and transmission mechanism capable of transmitting the full power of the engine under all working conditions without evidence of overload. Unless otherwise stated in the invitation to bid, the clutch may be omitted on size $3\frac{1}{2}$-S tilting drum type mixer.

D-11. Safety Guards. All moving parts of danger shall be safely guarded and protected to prevent fouling.

D-12. Lubrication. All bearings and moving parts on the mixer assembly requiring lubrication shall be fitted with appropriate devices capable of insuring adequate lubrication.

D-13. Special Equipment. When specified in the invitation to bid, any or all of the following special equipment shall be furnished with mixer units.

D-13a. Batchmeter. The mixer shall be equipped with a suitable batchmeter to insure accurate timing of each batch. Batchmeter shall be equipped with a positive locking device to prevent discharge of the batch before the end of the mixing period.

D-13b. Water Pump. The mixer shall be equipped with a suitable self-priming centrifugal type water pump, capable of pumping dirty water without clogging or excessive wear and supplying a sufficient quantity of water at the required pressure to operate the mixer at full capacity.

D-14. Tools. The mixer units shall be furnished with a complement of small tools and accessories in accordance with the provisions of the Concrete Mixer Standards of the Association of General Contractors.

D-15. Literature. Each mixer unit shall be furnished with two copies of instructions for operation, maintenance and repair together with two copies of manufacturer's repair parts catalogue.

E. TEST REQUIREMENTS AND PLANT INSPECTION.

When standard production units which have a record of satisfactory performance in the field under conditions substantially equivalent to the service requirements are furnished under the specifications, no test will be required. When necessary to ascertain compliance with any of the provisions herein including the service requirements, field tests may be required before acceptance. The time, place, specific nature and extent of such field tests shall be stated in the bid proposal.

When necessary or desirable to ascertain compliance with the specifications, units may be inspected at the manufacturer's plant before shipment.

F. QUESTIONNAIRE.

The bidder shall accompany his bid with the following questionnaire, fully completed.

F-1. Unit offered: Make_____Model_____

F-2. Size_____(A.G.C.Rating) Working weight_____

F-3. Shipping weight_____Volume and how packaged_____

F-4. Number of units per standard freight car_____

F-5. Type of trailer mounting_____

F-6. Wheels: Size_____Tires_____T&R.A.Rating_____(Pneumatic)

F-7. Mixing drum: Tilting or nontilting_____Head material_____
Gauge of shell_____Speed of drum_____R.P.M.

F-8. Water measuring tank: Make_____Type_____Capacity_____

F-9. Power Unit: Engine make_____Model_____Number of cylinders_____
_____Manufacturer's rated h.p._____at_____r.p.m.
Cooling system_____Magneto make_____Aircleaner_____
Governor_____

F-10. Make and kind of bearings used: Wheels_____Drum_____
Others_____Lubrication method_____

F-11. Batchmeter: Make_____Model_____

F-12. Water Pump: Make_____Model_____Type and Capacity_____
_____

F-13. The concrete mixers we propose to furnish deviate from the specification requirements in the following particulars: _____

_____

_____

_____

F-14. It is agreed that in the event deviations are not listed nor exceptions filed that the Government may demand full and complete compliance with the specification requirements.

Signature _____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
Concrete Mixers, Trailer Mounted
Sizes 3½S, 5S, 7S, 10S, 14S

(Proposed)

December 18, 1939
Spec. A-CM-T-701

D. SPECIFICATIONS

It is the intent of this specification to describe power operated concrete mixers of the single-compartment one-opening drum or the single-compartment two-opening drum type, mounted as self-contained units upon two or four wheel trailers, all of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with concrete mixers of this type whether herein stipulated or not, together with appurtenances and attachments as may be stated in the invitation which are necessary to enable the unit to fulfill the service requirements. The right is reserved to accept units offered in response to this specification which deviate in a minor degree from any single requirement provided that the unit is otherwise in substantial accordance with the specification and that such deviation does not reduce its capacity, detract from its structural strength and ruggedness or in any manner impair the ability of the unit to perform the work required upon an equal basis and with comparable facility and efficiency with competitive units in its class.

D-1. Types. Each concrete mixer shall be furnished with a single rotating drum arranged to operate as follows:

Tilting: The rotating drum shall be capable of being tilted mechanically from a charging position to a discharging position.

Non-tilting: The position of the rotating drum shall be fixed and non-tilting; charging and discharging being accomplished through an appropriate opening in each head of the drum.

D-2. Size and Capacity. Concrete mixers shall be furnished in any one of five sizes, designated as follows:

(a) 3½-S
(b) 5-S
(c) 7-S
*(d) 10-S
*(e) 14-S

The size designations and the corresponding capacities of the concrete mixers furnished shall be in accordance with the current Concrete Mixer Standards adopted by the Mixer Manufacturers' Bureau of the Associated General Contractors of America, Inc.

* Bureaus should ascertain available types of mountings on 10-S and 14-S before specifying.

D-3. Classes. Tilting and non-tilting type concrete mixers shall be furnished with the following types of mountings and as specified in the invitation to bid:

Side Discharge: The rotating drum shall be located so as to discharge the mixed concrete from the side of the trailer.

End Discharge: The rotating drum shall be located so as to discharge the mixed concrete from the end of the trailer.

D-4. Trailer. The concrete mixer shall be assembled as a mobile unit, mounted upon either a two or a four wheel trailer as specified in the invitation to bid.

D-4a. Frame. The trailer shall be of adequate design with sturdy frame composed of structural steel shapes fabricated in accordance with recognized standards. It shall be spring mounted upon the axles to permit of rapid towing without damage, and the whole assembly shall be strong enough to resist all stresses imposed through operation and transportation of the mixer.

D-4b. Tow-pole or Tongue. The trailer shall be equipped with a sturdy tow-pole or tongue fitted with a swiveling clevis or equivalent device suitable for attachment to the towing vehicle. The tow-pole or tongue shall be telescoping or otherwise suitably arranged for stowing while not in use, so as not to interfere with the operation in and about the mixer while working.

D-4c. Jacks. The trailer shall be equipped with such standards, jacks or ground supports as may be necessary to provide support and stability to the mixer while operating.

D-4d. Wheels. Wheels shall be of the all steel spoke or automotive type, equipped with anti-friction bearings and adequate means for lubrication. They shall be fitted with flat steel rims, solid rubber or pneumatic tires as specified in the invitation to bid. When pneumatic tires are furnished, the size shall be sufficient to carry the full weight of the unit, including batch, in accordance with the standards of the Tire and Rim Manufacturers' Association.

D-5. Mixing Drum, Tilting Type. The mixing drum shall be sturdily constructed of abrasion resistant steel fitted with ball or roller bearings effectively sealed to exclude dirt or abrasives and shall be provided with adequate means for adjustment and lubrication. It shall revolve under full load, at the most efficient mixing speed.

D-5a. Tilting Mechanism. The tilting mechanism shall be geared and provided with a device to automatically hold the drum in any operating position.

D-5b. Mixing Blades. The drum shall be equipped with sufficient high grade, abrasion resistant steel mixing blades to insure thorough mixing and clean, rapid discharge of the batch.

D-5c. Spout. The drum opening or spout shall be of adequate size and shall be effectively reinforced to withstand rough usage.

D-6. Mixing Drum, Nontilting Type. The mixing drum shall be sturdily constructed of abrasion resistant steel and the metal in the drum heads and the drum shell shall be the heaviest gauge used commercially in the several sizes. It shall revolve, under full load, at the most efficient mixing speed. The method of attachment of the drum head to the drum shell shall be in accordance with the best commercial practice.

D-6a. Drum Rollers. The drum rollers shall be of chilled or pressed steel, equally wear resistant, accurately formed and shall be mounted upon roller or ball bearings suitably sealed to exclude abrasives and fitted with means for lubrication.

D-6b. Mixing Blades. The drum shall be equipped with the optimum number of mixing blades and buckets to insure a thorough mixing and clean rapid discharge of the batch.

D-7. Charging Skip. A power operated charging skip shall be furnished with all sizes of mixers except the size 3½-S tilting drum type, but may be required for this size when so specified in the invitation to bid.

D-7a. Skip Hoist and Clutch. The skip shall be sturdily constructed and shall be operated by a suitable hoist equipped with an adjustable clutch and be provided with a dependable device to automatically release the clutch and apply the brake when the skip has reached the uppermost limit of its charging position.

D-7b. Skip Shaking Device. The skip shall be furnished with a dependable and effective device to automatically shake the skip as it reaches the charging position.

D-7c. Skip Reinforcing. The lip and the closed end of the skip shall be adequately reinforced to withstand the bumping of wheel barrows.

D-7d. Skip Hoisting Cable. The hoisting cable shall be attached to the skip in such a manner that the stress in each part shall be the same and self-equalizing.

D-8. Water Measuring Tank. A water measuring tank shall be furnished with all sizes and mixers except the size 3½-S tilting drum type, but may be required for this size when so stated in the invitation to bid. The tank shall be of the pressure type, capable of accurately controlling the quantity of water delivered to each batch. Its capacity, fittings, and connections shall be in accordance with the provisions of the Concrete Mixer Standards of the Associated General Contractors of America.

D-9. Control Mechanism. All operating and control levers shall be within easy and convenient reach of the operator when standing in operating position.

D-10. Power Unit. The power unit shall be complete and self-contained, fully enclosed and mounted so as to be readily accessible for adjustment and repair. The enclosure shall be fitted with a suitable means for locking.

D-10a. Engine. The engine shall be of the internal combustion, four cycle type, using gasoline as a fuel and shall be furnished complete with all necessary operating accessories, including a moisture proof high-tension magneto with impulse coupling, governor and oil bath air cleaner. It shall be capable of supplying all of the power necessary to operate the mixer under all operating conditions continuously without evidence of overload. It shall develop its full rated power at a governed speed of approximately 1200 r.p.m.

D-10b. Clutch and Transmission. The power unit shall be furnished with a substantial clutch and transmission mechanism capable of transmitting the full power of the engine under all working conditions without evidence of overload. Unless otherwise stated in the invitation to bid, the clutch may be omitted on size $3\frac{1}{2}$-S tilting drum type mixer.

D-11. Safety Guards. All moving parts of danger shall be safely guarded and protected to prevent fouling.

D-12. Lubrication. All bearings and moving parts on the mixer assembly requiring lubrication shall be fitted with appropriate devices capable of insuring adequate lubrication.

D-13. Special Equipment. When specified in the invitation to bid, any or all of the following special equipment shall be furnished with mixer units.

D-13a. Batchmeter. The mixer shall be equipped with a suitable batchmeter to insure accurate timing of each batch. Batchmeter shall be equipped with a positive locking device to prevent discharge of the batch before the end of the mixing period.

D-13b. Water Pump. The mixer shall be equipped with a suitable self-priming centrifugal type water pump, capable of pumping dirty water without clogging or excessive wear and supplying a sufficient quantity of water at the required pressure to operate the mixer at full capacity.

D-14. Tools. The mixer units shall be furnished with a complement of small tools and accessories in accordance with the provisions of the Concrete Mixer Standards of the Association of General Contractors.

D-15. Literature. Each mixer unit shall be furnished with two copies of instructions for operation, maintenance and repair together with two copies of manufacturer's repair parts catalogue.

E. TEST REQUIREMENTS AND PLANT INSPECTION.

When standard production units which have a record of satisfactory performance in the field under conditions substantially equivalent to the service requirements are furnished under the specifications, no test will be required. When necessary to ascertain compliance with any of the provisions herein including the service requirements, field tests may be required before acceptance. The time, place, specific nature and extent of such field tests shall be stated in the bid proposal.

When necessary or desirable to ascertain compliance with the specifications, units may be inspected at the manufacturer's plant before shipment.

F. QUESTIONNAIRE.

The bidder shall accompany his bid with the following questionnaire, fully completed.

F-1. Unit offered: Make_____Model_____

F-2. Size_____(A.G.C.Rating) Working weight_____

F-3. Shipping weight_____Volume and how packaged_____

F-4. Number of units per standard freight car_____

F-5. Type of trailer mounting_____

F-6. Wheels: Size_____Tires_____T&R.A.Rating_____(Pneumatic)

F-7. Mixing drum: Tilting or nontilting_____Head material_____
Gauge of shell_____Speed of drum_____R.P.M.

F-8. Water measuring tank: Make_____Type_____Capacity_____

F-9. Power Unit: Engine make____Model_____Number of cylinders_____
_____Manufacturer's rated h.p._____at_____r.p.m.
Cooling system_____Magneto make_____Aircleaner_____
Governor_____

F-10. Make and kind of bearings used: Wheels_____Drum_____
Others_____Lubrication method_____

F-11. Batchmeter: Make_____Model_____

F-12. Water Pump: Make_____Model_____Type and Capacity_____
_____

F-13. The concrete mixers we propose to furnish deviate from the specification requirements in the following particulars: _____

_____

_____

_____

F-14. It is agreed that in the event deviations are not listed nor exceptions filed that the Government may demand full and complete compliance with the specification requirements.

Signature _____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

January 22, 1940

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 23

Subject: Tentative Standard Specifications covering Road Rippers.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering road rippers (A-RR-711) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS" and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than February 20, 1940.

W. K. Knauff
Acting Chairman,
Technical Advisory Board

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
(Proposed) ROAD RIPPERS
For use with 45, 60, and 90 H.P. Tractors

A -RR-711

D SPECIFICATIONS

It is the intent of this specification to describe road rippers of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with apparatus of this kind whether herein specified or not, together with such modifications and attachments as may be necessary to enable the unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth as regards dimensions, weights and mechanical features are for the purpose of describing and defining a group or class of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units offered in response to this invitation which may deviate in minor degree from particular requirements provided such deviation does not impair the ability of the unit to fulfill the service requirements or to perform upon an equal basis and with comparable efficiency with competitive units in its class.

D-1 Types. The ripper shall be the two wheel vertical lift or hay rake type, the movement from the digging to the cleaning or nondigging position of the standards and teeth shall be automatic through a mechanism actuated by the ripper wheels or through a power operated mechanism actuated by the tractor as may be stated in the invitation to bid.

D-2 Sizes. The ripper to be furnished under this specification shall be in accordance with the following dimensions corresponding to the type and size of tractor stated in the invitation to bid.

Tractor	Type	Control	Width of Cut	Minimum Weight
Nominal 45 H.P.	Vertical lift	Automatic	60"	2200 lbs.
" "	Hay Rake	"	60"	3300 lbs.
Nominal 60 H.P.	Vertical lift	"	60"	3900 lbs.
" "	Hay Rake	"	60"	4100 lbs.
" "	Hay Rake	Power	60"	4600 lbs.
" 90 H.P.	Hay Rake	Automatic	72"	6500 lbs.
" "	Hay Rake	Power	72"	7800 lbs.

D-3 Frame. The ripper frame shall be ruggedly constructed of high grade steel structural shapes and castings adequately braced and capable of transmitting the full tractive effort of the tractor plus impact to any one standard without permanent distortion or damage.

D-4 Wheels. The ripper shall be furnished with two steel wheels with wide steel rims mounted upon alloy steel axles and equipped with antifriction bearings and fitted for pressure lubrication.

D-5 Standards The ripper shall be equipped with five standards or tooth supports of adequate design constructed of high carbon steel forgings or castings properly heat treated and capable of withstanding the digging reactions imposed when the full draft of the tractor plus impact is applied to any one tooth. The standards shall be so mounted or attached to the frame that any one or any combination may be readily engaged or disengaged for digging as may be required.

D-6 Teeth. Each standard shall be furnished with a readily replaceable digging point or tooth composed of high grade manganese steel or equal shock and abrasion resistant metal. The contour of the tooth together with the design of the standard shall be such that the angle of incidence with the displaced material in all digging positions shall result in a downward reaction in the assembly.

D-7 Hitch. The ripper shall be furnished with a sturdy drawbar hitch of the full swiveling type adjustable for drawbar height.

D-8 Controls. The ripper shall be furnished with a suitable mechanism to control the depth to which the teeth penetrate and shall be capable of quick, easy adjustment from a minimum to maximum depth sufficient to develop the full drawbar effort of the tractor.

D-8a. Manual. Ripper of the wheel actuated type both vertical lift and hay rake shall be furnished with a substantial mechanism to engage or disengage the teeth or raise and lower the ripper from the digging position to the clearing or traveling position, controlled by suitable levers operated manually by means of ropes or other convenient means immediately accessible from the tractor operator's seat.

D-8b. Power. Ripper of the power actuated type shall be furnished complete with all necessary operating accessories and connections for either hydraulic or mechanical operation of the ripper and for the tractor specified in the invitation to bid. The control mechanism shall be located upon the tractor immediately accessible from the operator's seat.

D-9 Tools. The ripper shall be furnished with a complement of small tools and appliances sufficient to perform all the tasks of routine preventive maintenance and lubrication in the field.

D-10 Literature . Each ripper shall be furnished with two copies of instructions for operation and maintenance, together with two copies of the manufacturer's repair parts catalogue.

E TESTS

When standard production units which have a record of successful performance in the field under conditions substantially equivalent to the service requirements are furnished in response to this specification, no test will be required. When necessary to ascertain compliance with any of the provisions herein, including the service requirements, field test may be required before acceptance in which case the time, place, specific nature and extent of such field test shall be stated in the invitation to bid.

E-1 Inspection. When necessary or desirable to ascertain compliance with the specifications, units may be inspected at the manufacturer's plant before shipment.

F QUESTIONNAIRE

No bid will receive consideration unless the following questionnaire is fully completed.

F-1 Unit offered. Make_____Model_____

F-2 Size - warranted for use with tractor of_____nominal H.P.

F-3 Working weight_____Shipping weight_____

F-4 How shipped (Su, Kd, etc.)_____

F-5 Number of units per standard freight car_____

F-6 Size of standards_____Material_____

F-7 Material in teeth_____

F-8 Type of control _____

F-9 Digging depth_____Width of cut_____

F-10 Ground clearance teeth raised_____

F-11 The ripper we propose to furnish deviates from the specification requirements in the following particulars_____

_____

_____

F-12 It is agreed that in the event deviations are not listed nor exceptions taken, the Government may require full and complete compliance with the specification requirements.

Signature_____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

Technical Advisory Board January 27, 1940

TECHNICAL ADVISORY BOARD CIRCULAR NO. 24.

Subject: Tentative Standard Specifications covering Excavating and Carrying Scrapers.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a tentative specification has been prepared covering excavating and carrying scrapers (A-ECS-721) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS" and under "C. SERVICE REQUIREMENTS". Bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in the statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than February 27, 1940.

Otto Engelmann
Otto Engelmann
Chairman, Technical Advisory Board.

(Enclosure)

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
Excavating & Carrying Scrapers
Nominal 4,6,8,10,12,14 cubic yard sizes.

(Proposed) A-ECS-721

D. SPECIFICATIONS.

It is the intent of this specification to describe excavating and carrying scrapers of the four wheel, tractor drawn, power control type of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with apparatus of this kind, whether herein specified or not, together with such modifications and appurtenances as may be necessary to fulfill the service requirements. The particular minimum requirements hereinafter prescribed pertaining to dimensions, weights and mechanical features are for the purpose of describing and defining the several groups or classes of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units which may deviate in a minor degree from any particular requirement, provided such deviation does not impair the ability of the unit to fulfill the service requirements or to perform upon an equal basis with comparable efficiency with competitive units in its class.

D-1. Type. The scrapers shall be capable of digging consolidated earth to controllable depths consistent with the power of the tractor, transporting the loaded earth and spreading it to controllable depths up to 12 inches. They shall be of the four wheel, front loading and front discharging, power control, trailer type, mounted upon pneumatic-tired wheels. The front wheels shall be mounted in such a manner as to permit a cramping angle of not less than 90° and the rear wheels shall track within the cut made by the cutting edge.

D-2. Sizes. The scrapers shall comply with the following stipulations as regards dimensions, weight and mechanical features, and shall be furnished complete with all necessary operating accessories ready for attachment to and operation with the tractor specified in the invitation to bid.

D-2a. Detail Requirements.

Tractor D.B.H.P. (Nominal)	Nominal Capacity	Net Measured Capacity	Length of Cutting Edge	Method of Ejection	Minimum Tire Size	Weight with P.C.U
40	4 c.y.	3.5 c.y.	6'0"	Positive or Gravity	4(8.25 x 20) or 6(7.50 x 18)	7500#
50	6 c.y.	4.5 c.y.	6'0"	Positive or Gravity	4(9.75 x 20) or 6(9.00 x 20)	8100#
60	8 c.y.	6.0 c.y.	7'0"	Positive or Gravity	4(12.00 x 20) or 6(9.75 x 20)	9600#
75	10 c.y.	8.0 c.y.	7'0"	Positive or Gravity	6(10.50 x 20)	12,000#
90	12 c.y.	9.5 c.y.	8'6"	Positive or Gravity	6(13.50 x 20)	13,700#
95+	14 c.y.	11.0 c.y.	9'6"	Positive	6(13.50 x 20)	19,000#

D-2b. Nominal Capacity. The nominal capacity indicated in the tabulation (D-2a) is the net measured capacity of the scraper bowl plus a conservative allowance for heaping and is for the purpose of providing a convenient size designation.

D-2c. Net Measured Capacity. The scraper bowl shall have the net capacity in cubic yards specified for the several sizes in tabulation (D-2a) which shall be the actual volume measured as a geometrical solid determined from the net inside dimensions of the bottom, sides, back and front endgate in the closed position.

D-2d. Method of Ejection. Scrapers of the 4,6,8,10, and 12 yard sizes shall have a method of ejecting the contents of the bowl which will insure the entire and complete removal of the load under all operating conditions when handling the type of material stated in the service requirements. Scrapers of the 14 yard size shall be provided with a suitable mechanism for positively ejecting the contents of the bowl.

D-2e. Tire Sizes. The load carrying capacity of the tires furnished with the scrapers shall be not less than that of the minimum tire sizes specified. When scrapers which weigh more than the the minimum weight prescribed for each class are furnished, they shall be equipped with tires having a load carrying capacity in accordance with the Tire and Rim Association ratings equivalent to the proportionate share of the weight of the scraper plus the weight of the nominal capacity in cubic yards of earth (moist and loose) at 1900# per c.y.

D-2f. Weight. The weight specified in D-2a is the minimum weight of the scraper complete in operating condition, including the weight of the power control unit.

D-3. Frame. The frame shall be sturdily fabricated of structural grade steel plates and shapes capable of transmitting the full drawbar effort of the tractor plus impact to the cutting edge and withstanding the strains of transporting the load without warping or deformation sufficient to bind any of the working mechanism.

D-4. Bowl. The scraper bowl shall be sturdily constructed of heavy steel plates capable of withstanding all the stresses of digging, transporting and spreading the load without undue distortion. The bowl shall be mounted in the frame so as to provide for ground clearance of not less than 12 inches when transporting the load and shall be fitted with a front opening gate capable of passing rock or boulders having a maximum dimension of 24". In the transporting position, the gate shall close tightly and prevent spilling.

D-4a. Cutting Edge. The bowl shall be fitted with a replaceable cutting edge of manganese steel or equal abrasion resistant metal, one-half ($\frac{1}{2}$")inch thick and not less than the length specified in D-2a.

D-5. Tongue and Hitch. The scrapers shall be furnished with a sturdy towing tongue equipped with a full swiveling hitch for attachment to the tractor drawbar.

D-6. Wheels. The scrapers shall be equipped with pneumatic tires and tubes of the standard earth moving vehicle type with sturdy steel wheels mounted upon heavy duty taper roller bearings or equal. The wheel bearings shall be completely and effectively sealed to exclude dust and dirt and shall be fitted for high pressure lubrication.

D-7. Power Controls. All the movements of the bowl, gate and unloading devices from the digging position to the transporting, spreading, and dumping positions and vice versa, shall be accomplished by hydraulic or cable-operated mechanisms actuated by power derived from the tractor through a power-take-off connected pump or winch or through independent power source mounted upon the scraper. The digging depth and the dumping height shall be controllable at any point throughout the range from minimum to maximum and the scraper

shall be capable of digging consolidated earth to a depth sufficient to develop the full drawbar effort of the tractor. All the operating movements shall be governed by suitable controls, mounted upon the tractor immediately and conveniently accessible from the tractor operator's seat.

D-8. Stability. The scrapers shall be capable of performing all functions and maneuvers while operating in any direction upon a side slope of 33-1/3 per cent.

D-9. Tools. The scraper shall be furnished with a complement of small tools and appliances sufficient to perform all the tasks of routine preventive maintenance and lubrication in the field.

D-10. Literature. The scrapers shall be furnished with two copies of instructions for operation and maintenance together with two copies of the manufacturer's repair parts catalog.

E. TESTS

When standard production units which have a record of successful performance in the field under working conditions substantially equivalent to the service requirements are furnished in response to this specification, no test will be required. When necessary to ascertain compliance with any of the provisions herein, including the service requirements, field tests before acceptance may be required in which case the time, place, specific nature and extent of such tests shall be stated in the invitation to bid.

E-1. Inspection. When necessary or desirable to ascertain compliance with the specifications, units may be inspected at the manufacturer's plant before shipment.

F. QUESTIONNAIRE.

No bid will receive consideration unless the following questionnaire is fully completed.

F-1. Unit offered. Make_____ Model_____

F-2. Manufacturer's rated size or capacity_____c.y.

F-3. Minimum size tractor recommended for use with scraper_____D.B.H.P.

F-4. Net measured capacity of bowl (D-2c)_____c.y.

F-5. Scraper, working weight_____lbs. Shipping weight_____lbs.

F-6. Load: Rated capacity_____c.y. (@ 1900 #/c.y.) Weight of load _____lbs.

F-7. Gross weight on tires_____lbs.

F-8. Gross load on front tires_____lbs % of gross_____%

F-9. Gross load on rear tires_____lbs. % of gross_____%

F-10. Number of tires front_____size of tires_____.

F-11. Number of tires rear_____size of tires_____.

F-12. Material in cutting edge_____size of cutting edge_____

F-13. Type of power control_____method of ejection_____

F-14. Ground clearance_____depth of cut_____spread height_____

F-15. Shipping method (Su., Kd., etc.)_____number of units per carload_____

F-16. The scraper we propose to furnish deviates from the specification requirements in the following particulars_____

_____

_____

_____ _____

F-17. It is agreed that in the event deviations are not listed nor exceptions taken, the Government may require full and complete compliance with the specification requirements.

Signature_____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE
Tentative Technical Specifications
for
Excavating & Carrying Scrapers
Nominal 4,6,8,10,12,14 cubic yard sizes.

(Proposed) A-ECS-721

D. SPECIFICATIONS.

It is the intent of this specification to describe excavating and carrying scrapers of the four wheel, tractor drawn, power control type of conventional design and sturdy construction complete with all necessary operating accessories customarily furnished with apparatus of this kind, whether herein specified or not, together with such modifications and appurtenances as may be necessary to fulfill the service requirements. The particular minimum requirements hereinafter prescribed pertaining to dimensions, weights and mechanical features are for the purpose of describing and defining the several groups or classes of units which experience has shown are comparable and substantially equivalent in stamina and performance. The right is reserved to accept units which may deviate in a minor degree from any particular requirement, provided such deviation does not impair the ability of the unit to fulfill the service requirements or to perform upon an equal basis with comparable efficiency with competitive units in its class.

D-1. Type. The scrapers shall be capable of digging consolidated earth to controllable depths consistent with the power of the tractor, transporting the loaded earth and spreading it to controllable depths up to 12 inches. They shall be of the four wheel, front loading and front discharging, power control, trailer type, mounted upon pneumatic-tired wheels, The front wheels shall be mounted in such a manner as to permit a cramping angle of not less than 90° and the rear wheels shall track within the cut made by the cutting edge.

D-2. Sizes. The scrapers shall comply with the following stipulations as regards dimensions, weight and mechanical features, and shall be furnished complete with all necessary operating accessories ready for attachment to and operation with the tractor specified in the invitation to bid.

D-2a. Detail Requirements.

Tractor D.B.H.P. (Nominal)	Nominal Capacity	Net Measured Capacity	Length of Cutting Edge	Method of Ejection	Minimum Tire Size	Weight with P.C.U
40	4 c.y.	3.5 c.y.	6'0"	Positive or Gravity	4(8.25 x 20) or 6(7.50 x 18)	7500#
50	6 c.y.	4.5 c.y.	6'0"	Positive or Gravity	4(9.75 x 20) or 6(9.00 x 20)	8100#
60	8 c.y.	6.0 c.y.	7'0"	Positive or Gravity	4(12.00 x 20) or 6(9.75 x 20)	9600#
75	10 c.y.	8.0 c.y.	7'0"	Positive or Gravity	6(10.50 x 20)	12,000#
90	12 c.y.	9.5 c.y.	8'6"	Positive or Gravity	6(13.50 x 20)	13,700#
95+	14 c.y.	11.0 c.y.	9'6"	Positive	6(13.50 x 20)	19,000#

D-2b. Nominal Capacity. The nominal capacity indicated in the tabulation (D-2a) is the net measured capacity of the scraper bowl plus a conservative allowance for heaping and is for the purpose of providing a convenient size designation.

D-2c. Net Measured Capacity. The scraper bowl shall have the net capacity in cubic yards specified for the several sizes in tabulation (D-2a) which shall be the actual volume measured as a geometrical solid determined from the net inside dimensions of the bottom, sides, back and front endgate in the closed position.

D-2d. Method of Ejection. Scrapers of the 4,6,8,10, and 12 yard sizes shall have a method of ejecting the contents of the bowl which will insure the entire and complete removal of the load under all operating conditions when handling the type of material stated in the service requirements. Scrapers of the 14 yard size shall be provided with a suitable mechanism for positively ejecting the contents of the bowl.

D-2e. Tire Sizes. The load carrying capacity of the tires furnished with the scrapers shall be not less than that of the minimum tire sizes specified. When scrapers which weigh more than the the minimum weight prescribed for each class are furnished, they shall be equipped with tires having a load carrying capacity in accordance with the Tire and Rim Association ratings equivalent to the proportionate share of the weight of the scraper plus the weight of the nominal capacity in cubic yards of earth (moist and loose) at 1900# per c.y.

D-2f. Weight. The weight specified in D-2a is the minimum weight of the scraper complete in operating condition, including the weight of the power control unit.

D-3. Frame. The frame shall be sturdily fabricated of structural grade steel plates and shapes capable of transmitting the full drawbar effort of the tractor plus impact to the cutting edge and withstanding the strains of transporting the load without warping or deformation sufficient to bind any of the working mechanism.

D-4. Bowl. The scraper bowl shall be sturdily constructed of heavy steel plates capable of withstanding all the stresses of digging, transporting and spreading the load without undue distortion. The bowl shall be mounted in the frame so as to provide for ground clearance of not less than 12 inches when transporting the load and shall be fitted with a front opening gate capable of passing rock or boulders having a maximum dimension of 24". In the transporting position, the gate shall close tightly and prevent spilling.

D-4a. Cutting Edge. The bowl shall be fitted with a replaceable cutting edge of manganese steel or equal abrasion resistant metal, one-half (½") inch thick and not less than the length specified in D-2a.

D-5. Tongue and Hitch. The scrapers shall be furnished with a sturdy towing tongue equipped with a full swiveling hitch for attachment to the tractor drawbar.

D-6. Wheels. The scrapers shall be equipped with pneumatic tires and tubes of the standard earth moving vehicle type with sturdy steel wheels mounted upon heavy duty taper roller bearings or equal. The wheel bearings shall be completely and effectively sealed to exclude dust and dirt and shall be fitted for high pressure lubrication.

D-7. Power Controls. All the movements of the bowl, gate and unloading devices from the digging position to the transporting, spreading, and dumping positions and vice versa, shall be accomplished by hydraulic or cable-operated mechanisms actuated by power derived from the tractor through a power-take-off connected pump or winch or through independent power source mounted upon the scraper. The digging depth and the dumping height shall be controllable at any point throughout the range from minimum to maximum and the scraper

shall be capable of digging consolidated earth to a depth sufficient to develop the full drawbar effort of the tractor. All the operating movements shall be governed by suitable controls, mounted upon the tractor immediately and conveniently accessible from the tractor operator's seat.

D-8. Stability. The scrapers shall be capable of performing all functions and maneuvers while operating in any direction upon a side slope of 33-1/3 per cent.

D-9. Tools. The scraper shall be furnished with a complement of small tools and appliances sufficient to perform all the tasks of routine preventive maintenance and lubrication in the field.

D-10. Literature. The scrapers shall be furnished with two copies of instructions for operation and maintenance together with two copies of the manufacturer's repair parts catalog.

E. TESTS

When standard production units which have a record of successful performance in the field under working conditions substantially equivalent to the service requirements are furnished in response to this specification, no test will be required. When necessary to ascertain compliance with any of the provisions herein, including the service requirements, field tests before acceptance may be required in which case the time, place, specific nature and extent of such tests shall be stated in the invitation to bid.

E-1. Inspection. When necessary or desirable to ascertain compliance with the specifications, units may be inspected at the manufacturer's plant before shipment.

F. QUESTIONNAIRE.

No bid will receive consideration unless the following questionnaire is fully completed.

F-1. Unit offered. Make_____Model_____

F-2. Manufacturer's rated size or capacity_____c.y.

F-3. Minimum size tractor recommended for use with scraper_____D.B.H.P.

F-4. Net measured capacity of bowl (D-2c)_____c.y.

F-5. Scraper, working weight_____lbs. Shipping weight_____lbs.

F-6. Load: Rated capacity_____c.y. (@ 1900 #/c.y.) Weight of load _____lbs.

F-7. Gross weight on tires_____lbs.

F-8. Gross load on front tires_____lbs % of gross_____%

F-9. Gross load on rear tires_____lbs. % of gross_____%

F-10. Number of tires front_____size of tires_____.

F-11. Number of tires rear_____size of tires_____.

F-12. Material in cutting edge_____size of cutting edge_____

F-13. Type of power control_____method of ejection_____

F-14. Ground clearance_____depth of cut_____spread height_____

F-15. Shipping method (Su., Kd., etc.)_____number of units per carload_____

F-16. The scraper we propose to furnish deviates from the specification requirements in the following particulars_____

_____

_____

_____ _____

F-17. It is agreed that in the event deviations are not listed nor exceptions taken, the Government may require full and complete compliance with the specification requirements.

Signature_____

Title_____

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

Technical Advisory Board

January 27, 1940

TECHNICAL ADVISORY BOARD CIRCULAR NO. 25

Subject: Consolidated Equipment Repair Facilities

To Chiefs of Bureaus and Offices:

Pursuant to the Departmental equipment repair policy as stated in the Secretary's memorandum No. 818, (and which it is reported is proving highly satisfactory) the Repair Shop Committee of the Technical Advisory Board has completed a preliminary survey of existing repair shop facilities in the area comprising the States of North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas, Louisiana and the Texas Panhandle. The study indicates that the interests of the agencies operating within this area would be best served if shops operating in accordance with the provisions of memorandum No. 818 were located at the points named in the following tabulation:

Bureau Requesting Designation	Location	Existing Shop Operated by:	Class of Shop
SCS	Danville, Virginia	SCS	B
FS	Ashville, North Carolina	FS	A
FS	Franklin, North Carolina	No shop	
FS	Columbia, South Carolina	FS SCS	A b
SCS	Spartansburg, South Carolina	SCS	A
FSA	Atlanta, Georgia	FSA	A
FS	Gainesville, Georgia	FS	A
SCS	Nashville, Tennessee	No shop	
SCS	Jackson, Mississippi	No shop	
FSA SCS	Minden, Louisiana	SCS	A
FS	Hot Springs, Arkansas	FS	A
FSA SCS	Little Rock, Arkansas	SCS E&PQ	A B

Bureau Requesting Designation	Location	Existing Shop Operated by:	Class of Shop
FS	Russellville, Arkansas	SCS	A
FS	Lufkin, Texas	FS	A
SCS	Amarillo, Texas	SCS	A

The large amount of equipment operating within this area appears to require facilities for service, repair and rehabilitation to the extent indicated. It appears quite possible however that if consolidations are effected at the several points listed, certain secondary shops now operating in close proximity may become unnecessary and may be dispensed with.

It is requested that the several agencies now operating within this area review this proposal in some detail and compile a reasonable approximation of the number of units of equipment by classes which could be served at each location. The total of all such units when compiled by the Board will serve as an index of the potential work load upon the several shops. In addition to the foregoing information, the Board would appreciate your comments and criticisms of the proposed plan not later than February 15, 1940.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board.

Files
Mr. Reid

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

Technical Advisory Board February 7, 1940

TECHNICAL ADVISORY BOARD CIRCULAR NO. 26

Subject: Tentative Standard Specifications covering Precision Airplane Mapping Camera.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's Memorandum No. 819 of May 12, 1939, defining the functions, duties, and responsibilities of the Technical Advisory Board, a set of specifications approved by the American Society of Photogrammetry and prepared by its Precision Camera Committee, of which Dr. Irvine C. Gardner, Chief of the Optical Division of the National Bureau of Standards, was Chairman, is submitted herewith for your consideration and comment.

When and if this specification is approved by the Technical Advisory Board and is promulgated for Departmental use, it will be with the understanding that it will not become effective before January 1, 1941.

This latter date is set far enough in advance to permit sufficient time for the industry to manufacture such cameras and have them on hand when their use becomes mandatory.

The desirability for immediate issuance and promulgation of this specification is for the purpose of advising the manufacturers of the Departmental standardization of this equipment, as at the present time there is a manifested and natural hesitancy in manufacturing such equipment without some Governmental assurance it will be required.

Two copies of this specification are being furnished you. The Board will appreciate receiving your comments and suggestions not later than February 26.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board

Enclosures

SPECIFICATIONS FOR A PRECISION
AIRPLANE MAPPING CAMERA
(Revision of June 5, 1939)

(1) Constructional details necessary to permit testing.

In order to permit the necessary tests for the determination of the calibrated focal length, distortion and position of principal point without the introduction of errors resulting from film shrinkage, the camera shall be constructed in accordance with the following requirements:

(a) It shall be possible to insert a photographic plate between the frame that determines the position of the focal plane and the platen that normally flattens the film in the local plane.

(b) The focal plane shall be accessible from the rear so that a telescope, placed behind the camera and directed along the axis of the lens, may view objects through the camera lens. The opening providing this unobstructed vision shall be not less than an inch in diameter and may be provided by removable screw caps or by the partial disassembly of the magazine and the removal of the platen that presses the film against the focal plane. The removal of parts to secure this vision shall not include the removal of the collimation index markers or of the frame that determines the location of the focal plane.

(2) Constructional details required for metrical precision.

(a) The portion of the surface of the platen against which the film is held to insure its planeness shall not depart more than ±0.0005 inch from a plane.

(b) The lens barrel shall be so constructed that disassembly for cleaning the inner lens surfaces of the front and rear lens cells or repairing the shutter and reassembly shall introduce no changes in the calibration constants greater than their probable errors. Disassembly of the lens beyond that required for cleaning the inner surfaces of the front and rear lens cells or repairing the shutter shall be prevented by lock screws or equivalent devices.

(c) In cameras in which the shutter curtain or blades do not operate between the lens components, the operation shall be such that the total duration of exposure for the entire plate is not greater than 1/50 second for an exposure of 1/100 second.

(d) The collimation index markers shall be as shown on drawing No. ____ which forms a part of these specifications. The lines joining the opposite members of the two pairs of index markers shall intersect at an angle of 90° ±1 minute and shall indicate the location of the principal point with a probable error not exceeding ±0.03 mm.

(e) The dimensional changes of the camera arising from causes other than temperature shall be sufficiently small to permit the determination of the calibrated focal length with a probable error not exceeding ± 0.05 mm.

(f) The dimensional changes arising from temperature or other variations likely to be encountered in use shall not be inconsistent with the determination of the location of the principal point with a probable error not exceeding ± 0.03 mm.

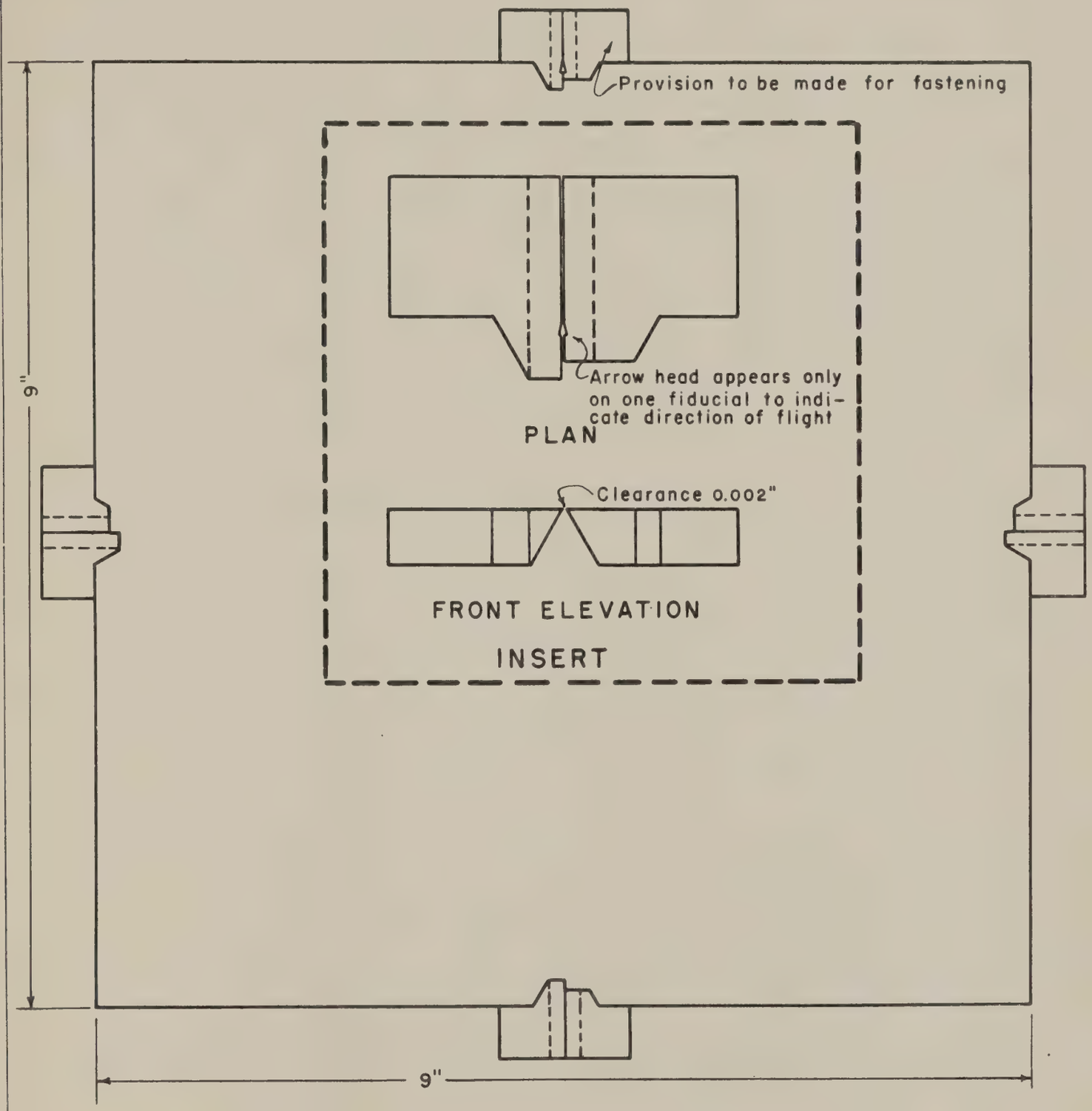
(3) Specifications for the lens.

All tests of the lens contributing to the determination of the calibration constants of the camera will be made with the lens mounted in the camera.

(a) No lens shall be used which, at the maximum stop opening, fails to resolve lines in any orientation spaced 20 to the millimeter at the center of the field; or which fails to resolve lines in any orientation spaced 7 to the millimeter at all 5° intervals lying between the center and the center of the shorter side of the negative; or which fails to resolve lines in at least one orientation spaced 5 to the millimeter at the angular distance from the center of the field which is the multiple of 5 degrees falling within the field and nearest the corner of the negative. The resolution test shall be made in accordance with the standard practice of the National Bureau of Standards.

(b) For a camera using 9 by 9 or 7 by 9 inch films or plates and having a lens of approximately 8 inch focal length, the distortion, referred to the calibrated focal length, shall not exceed ± 0.03 mm.

(c) The tolerances for resolution and distortion embodied in these specifications do not apply to cameras equipped with lenses of equivalent focal length of 6 1/2 inches or less, nor to cameras making negatives larger than 10 by 10 inches. For such cameras the appropriate tolerances shall be specified by the contracting agency.



AMERICAN SOCIETY OF PHOTOGRAMMETRY

DESIGN OF COLLIMATION MARKS
FOR PROPOSED PRECISION CAMERA

MARCH 22, 1939

UNITED STATES DEPARTMENT OF AGRICULTURE
SPECIFICATIONS
for
ENGINEERS' WYE LEVELS, COMPLETE WITH TRIPOD AND ACCESSORIES

D. SPECIFICATIONS

It is the intent of this specification to describe an engineers' wye level of conventional design and sturdy construction complete with tripod and all other accessories customarily furnished with engineers' wye levels of this type whether hereinafter stipulated or not, together with such modifications and adjustments as may be essential to enable a unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth, as regards dimensions and mechanical features, are intended to describe and define an Engineers' Wye Level of this class. Minor deviations from these specifications may be allowed when such deviations do not impair the efficiency or performance of the equipment offered.

D-1. MATERIAL AND WORKMANSHIP. The instrument is to be made of the best materials and with optical construction, design, and workmanship of the highest order. The main telescope tube, bar, spindle, leveling head, tripod head and footplate shall be of hard bronze or metal of equivalent physical properties. Inferior materials, design, or workmanship will not be acceptable. The instrument must be guaranteed by the bidder against defective materials and workmanship and to be capable of maintaining its adjustment under the service conditions described in the Service Requirements. The successful bidder who is awarded the contract will be required to replace all parts found to be defective.

D-2. TELESCOPE. The telescope shall be of the internal focusing or inner slide type, with rack and pinion movement and shall have an effective aperture of not less than 1.53 inches; an erecting eyepiece with magnifying power of not less than 38 diameters; cross and stadia wires of platinum not to exceed 2/10,000-inch in diameter; stadia wires fixed so as to subtend on the rod 1/100 of the horizontal distance from the instrument to the rod, with a tolerance of plus or minus 0.3 percent without allowance for the constant f plus c. Means shall be provided for adjusting the cross wires with the optical axis of the telescope.

If pinion mount, or saddle, is attached to the telescope with screws, it shall also be sweated. Suitable objective and eyepiece caps shall be provided.

The precision of focusing movement shall be such that the line of collimation shall not change more than 3 seconds for the complete focusing range. The minimum focus from center of instrument shall not be more than 12 feet. The limiting angle of resolution shall be not greater than 5 seconds.

The level vial shall have a sensitivity of 20 seconds of arc, plus or minus 2 seconds for each graduation.

D-2a. ABERRATION. The system shall be sensibly free from spherical aberration, chromatic aberration, coma, curvature, and distortion, and there shall be no sensible internal reflection. The definition shall be excellent.

D-2b. ADJUSTMENT. The vial shall be provided with a suitable means of adjustment so that the line of collimation and axis of bubble may be made parallel to each other and perpendicular to the vertical axis of the instrument, and to be provided with means of locking when in adjustment.

With the telescope set on a definite point, the clamping of the clamp screw shall not move the cross wire more than 1 minute from this definite point.

D-3. LEVELING HEAD AND FOOTPLATE. The leveling head shall be of the four-screw type. Means shall be provided for taking up the wear of the leveling screws, or the design shall provide for easy removal or replacement of worn screws or sockets in the field. The footplate threads shall be 3-1/2 - 8 U.S.S. threads, in accordance with the National Bureau of Standards drawing No. B-1180. On the side of the footplate the following shall be engraved or otherwise permanently marked: "3-1/2 - 8 thds." No adapters will be permitted.

D-4. ADJUSTMENTS AND FINISH. All parts and fittings shall be of design, quality and accuracy commensurate with the graduations and the telescopic requirements. All adjusting devices shall be positive in action. The instrument is to be provided with a dark finish.

D-5. TRIPOD. Extension or non-extension type tripod provided with metal cap, as specified in invitation to bid, of a quality not less than manufacturer's standard production for this class of instrument as offered the public generally.

D-5a. TRIPOD HEAD. The tripod head shall be threaded with the standard 3-1/2 inch, 8 thread, National Bureau of Standards. Each tripod head shall be permanently marked on the side as follows: "3-1/2 inch - 8 thread, National Bureau of Standards". The wing nut bolts shall be so constructed as to prevent turning when the wing nut is being tightened. A washer shall be placed under each wing nut.

D-6. CARRYING CASE AND ACCESSORIES. A substantial hardwood carrying case with carrying strap shall be furnished to protect the instrument against damage when being transported in the field. The following accessories are to be furnished and fitted into the case: waterproof cover, adjusting pins, screw driver, sunshade, wrenches as required, oil container, plumb bob, instruction book, extra level vials, and any other standard accessories usually furnished the public generally.

D-7. SHIPMENT. All instruments and tripods furnished shall be suitably packed or crated for shipment. Contractor shall be held responsible for items damaged in transit due to lack of, or inadequate, protection.

E. TEST REQUIREMENTS

If it cannot be determined from the information furnished with the bid whether the instrument offered is capable of performing the described service, the instrument delivered by the successful bidder will be subject to test during a trial period of one month under these actual working conditions. Payment and final acceptance will be withheld until instrument is proved successful during such trial period.

If prompt payment discount is offered, the payment period will be reckoned from date of final inspection and acceptance at point of delivery. The Government reserves the right to accept the instrument only after a field inspection and a test trial at point of delivery. If the result of this test shows noncompliance with specifications, the Government reserves the right to have the equipment tested by the National Bureau of Standards.

In the event the instrument tested fails to satisfactorily perform the work during the test period, the instrument will be rejected and turned over to the manufacturer in whatever condition it happens to be at the end of the test. The contractor will be required to pay all charges incident to the return of the rejected instrument.

The Government will not be liable for any damage to the instrument as a result of such test, provided such damage is not due to accident or other causes not in accordance with normal or usual care of such equipment.

F. QUESTIONNAIRE FOR ENGINEERS' WYE LEVELS COMPLETE WITH TRIPOD AND ACCESSORIES

No bid will be considered unless accompanied by the following questionnaire fully completed by the bidder.

IMPORTANT NOTE: The bidder guarantees the instrument to have a precision and accuracy, as well as to be of the quality and workmanship, not less than that described in his reply to the following:

F-1. Make _____, Model Number _____

F-2. Weight of instrument only as offered _____ pounds

F-3. Telescope, focusing: Internal _____, External _____,

Focusing Mechanism _____

F-4. Length of telescope _____ inches.

F-5. Description of pinion mount, how attached _____

_____

F-6. Cross and stadia wires, material _____

F-7. Percent of deviation from ratio 1:100 of stadia hairs rod reading to distance for shots over 50 feet _____, and magnitude of f plus c _____ inches.

F-8. Is eyepiece equipped with slide _____ yes; _____ no.

F-9. Type of telescope: erecting _____, inverting _____,

Effective aperture _____ inches.

F-10. Will the precision of focusing move the line of collimation more than 3 seconds for complete focusing range _____ yes; _____ no.

F-11. Minimum focus from center of instrument _____ feet.

F-12. Magnifying power _____ diameters.

F-13. What is the true field of view _____ degrees.

F-14. Diameter of exit pupil _____ mm.

F-15. Limiting angle of resolution _____ seconds.

F-16. Is spindle exactly concentric with vertical axis of level _____.

F-17. Level vial, graduations _____; sensitivity _____ seconds.

Is vial provided with means of locking _____ yes; _____ no.

F-18. In clamping of the clamp screw, do cross wires move more than one minute from definite point _____ yes; _____ no.

F-19. Leveling head, type _____

F-20. Footplate, size and threads _____, marking _____

F-21. State if the required accessories are supplied _____ yes; _____ no.

F-22. Tripod, straight-leg non-extension type, when required in invitation to bid:

Manufacturer _____, Model _____,

Length _____ inches, Weight _____ pounds,

Material _____

F-23. Tripod, extension type, when required in invitation to bid:

Length, non-extended _____ inches

Length, extended _____ inches

Weight _____ pounds, Material _____

Manufacturer _____, Model _____

F-24. Carrying Case. Is carrying case furnished in accordance with specifications

_____ yes; _____ no.

F-25. The engineers' wye level we propose to furnish under this invitation to bid, deviates from the specification requirements in the following particulars:

_____

_____

_____

_____

F-26. It is agreed that in the event deviations are not listed or filed under paragraph F-25, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Plant and Operations
Washington, D. C.

Technical Advisory Board March 8, 1940

TECHNICAL ADVISORY BOARD CIRCULAR NO. 27

Subject: Consolidated Equipment Repair Facilities.

To Chiefs of Bureaus and Offices:

In response to TAB Circular No. 25 soliciting additional information and comment upon the proposal to designate certain existing repair shops as Departmental shops, the several agencies operating in the Southeastern Area have supplied the data required. The Repair Shop Committee after a review and discussion of the subject suggests that the repair shop facilities now being operated at the following locations be designated as Departmental shops and prepare to function in accordance with the procedure prescribed in the Secretary's Memorandum No. 818 governing the operation of the Departmental Shops at Missoula, Montana; Denver, Colorado, and Albuquerque, New Mexico.

Location	Operating Agency
Asheville, North Carolina	Forest Service
Spartanburg, South Carolina	Soil Conservation Service
Atlanta, Georgia	Farm Security Administration
Gainesville, Georgia	Forest Service
Amarillo, Texas	Soil Conservation Service

The present facilities at the foregoing locations are sufficient at the moment only for the normal demand of the operating agency but each agency has expressed a willingness to undertake expansion and limited service may be offered for the time being contemplating gradual expansion until the facilities are capable of accommodating the potential load.

In Circular No. 25, it will be noted, a list of fifteen prospective locations was presented. Those remaining not suggested for designation at this time seem to require further study. For the sake of completeness the remaining ten locations are repeated:

Bureau Requesting Designation	Location	Existing Shop Operated by:	Class of Shop
SCS	Danville, Virginia	SCS	B
FS	Franklin, North Carolina	No shop	
FS	Columbia, South Carolina	FS SCS	A b
SCS	Nashville, Tennessee	No shop	
SCS	Jackson, Mississippi	No shop	
FSA SCS	Minden, Louisiana	SCS	A
FS	Hot Springs, Arkansas	FS	A
FSA SCS	Little Rock, Arkansas	SCS E&PQ	A B
FS	Russellville, Arkansas	SCS	A
FS	Lufkin, Texas	FS	A

The extent of facilities required, the prospective work load and fiscal provisions appear to be the chief difficulties in the way of organization at these latter points at the moment. It is suggested that the Bureaus most interested in the establishment of shops at these points arrange to consider the problems involved by direct negotiation with each other to the end that cooperative arrangements perhaps, both operative and fiscal be concluded whereby facilities sufficient for the need may be provided. To assist in this study a compilation of equipment by states as reported by the several Bureaus operating in the Area is as follows:

Location (State)	S.C.S. Auto.	S.C.S. Misc.	A.M.S. Auto.	A.M.S. Misc.	F & D. Auto.	F & D. Misc.	B. P. I. Auto.	B. P. I. Misc.	F. S. Auto.	F. S. Misc.	F. S. A. Auto.	F. S. A. Misc.	E.& F.Q. Auto.	E.& F.Q. Misc.	TOTAL BY STATE Auto.	TOTAL BY STATE Misc.	TOTAL ALL EQUIPMENT BY STATE
N.C.	183	58	12	None	None	None	None	None	47	42	57	181	None	None	299	281	580
S.C.	390	119	2	None	None	None	2	6	26	25	34	52	6	None	460	202	662
TENN.	28	2	19	1	None	None	None	None	No Report		24	48	12	None	83	51	134
GEORGIA	254	92	17	None	9	None	1	None	50	55	26	27	15	None	372	174	546
FLORIDA	145	35	1	None	None	None	None	None	No Report		14	14	None	None	160	49	209
ALABAMA	150	46	None	None	None	None	None	None	No Report		69	70	None	None	219	116	335
MISS.	211	37	3	1	None	None	2	None	31	11	21	66	None	None	268	115	383
LA.	154	28	12	None	None	None	None	None	10	2	11	57	None	None	187	87	274
ARK.	274	43	7	None	None	None	None	None	85	59	38	186	9	None	413	288	701
TEXAS (Panhandle)	354	344	None	None	None	None	None	None	No Report		None	None	None	None	354	344	698
TOTAL AUTO BY BUREAU	2143		73		9		5		249		294		42		2815		
TOTAL MISC. BY BUREAU		804		2		0		6		194		701		0		1707	
																	4522

AUTO. CLASSIFICATION INCLUDES: Passenger Cars, Trucks, Trailers, Etc.

MISC. CLASSIFICATION INCLUDES: Farm Equipment, Construction Equipment, Etc.

Comment and criticism of the proposal to establish shops at the five locations first mentioned is invited and in the event no objections are raised, the Board will recommend their designation to the Secretary's Office. As regards the establishment of shops at the ten locations named in the second list, action will be withheld pending further study and report.

Otto Engelmann

Otto Engelmann
Chairman, Technical Advisory Board

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

May 1, 1940

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 28

Subject: Proposed Standard Specifications covering Engineers' Wye Levels, Complete with Tripod and Accessories.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a proposed specification has been prepared covering engineers' wye levels, complete with tripod and accessories (A-EWL-1111) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS" and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than June 3, 1940.

Otto Engelmann
Chairman, Technical Advisory Board.

Enclosures.

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PLANT & OPERATIONS
Washington, D. C.

May 2, 1940

Technical Advisory Board

TECHNICAL ADVISORY BOARD CIRCULAR NO. 29

Subject: Proposed Standard Specifications covering Engineers' Transit (With or Without Stadia Circle), Complete with Tripod and Accessories.

To Chiefs of Bureaus and Offices:

Pursuant to the Secretary's memorandum No. 819 of May 12, 1939, defining the duties of the Technical Advisory Board, a proposed specification has been prepared covering engineers' transit (with or without stadia circle), complete with tripod and accessories (A-ET-1121) which, when promulgated, will be for general use throughout the Department.

When promulgated and used as a standard specification, bureaus will furnish appropriate information under "A. APPLICABLE SPECIFICATIONS", "B. GENERAL CONDITIONS" and under "C. SERVICE REQUIREMENTS", bureaus should furnish a brief and concise statement substantiating the need for the particular type and size of apparatus specified. The following elements are characteristic of a good service requirement and as many as are applicable to the work at hand should appear in a statement establishing the bureau's needs:

1. Description of the job to be performed.
   a. Nature, extent and objective.
   b. Geographical location.
   c. Physical or other environmental conditions, i.e., topography, terrain, altitude, climatic conditions, laboratory, etc.
   d. Other pertinent or unusual requirements.

2. Justification for need of equipment specified.
   a. Adaptability of equipment to the work, i.e., size, capacity, accessories, attachments, special features, etc.
   *b. Unsatisfactory experience with other types of equipment.

*Conclusions of fact may appear in service requirements, but the requisitioning agency must have evidence to support conclusions.

Two copies of this specification are being sent to you. The Board will appreciate receiving your comments and suggestions not later than June 3, 1940.

Otto Engelmann
Chairman, Technical Advisory Board

Enclosures.

(Proposed) Spec. No. A-ET-1121

UNITED STATES DEPARTMENT OF AGRICULTURE
SPECIFICATIONS
for
ENGINEERS' TRANSIT (WITH OR WITHOUT STADIA CIRCLE),
COMPLETE WITH TRIPOD AND ACCESSORIES

D. SPECIFICATIONS

It is the intent of this specification to describe an engineers' transit (with or without stadia circle) of conventional design and sturdy construction complete with tripod and all other accessories customarily furnished with engineers' transits of this type whether hereinafter stipulated or not, together with such modifications and adjustments as may be essential to enable a unit to fulfill the service requirements. The particular minimum requirements hereinafter set forth, as regards dimensions and mechanical features, are intended to describe and define an engineers' transit of this class. Minor deviations from these specifications may be allowed when such deviations do not impair the efficiency or performance of the equipment offered.

D-1. MATERIAL AND WORKMANSHIP. The instrument is to be made of the best materials with optical construction, graduations, design, and workmanship to be of the highest order. Inferior materials, design, graduations or workmanship will not be acceptable. The main telescope tube, standards, spindle, leveling head, tripod head and footplate shall be of hard bronze or metal of equivalent physical properties. The instrument must be guaranteed by the bidder against defective workmanship and materials and to be capable of maintaining its adjustments under the service conditions described above. The successful bidder who is awarded the contract will be required to replace all parts found defective.

D-2. TELESCOPE. The telescope shall have an effective aperture of not less than 1.25 inches, an erecting eyepiece with magnifying power of not less than 24 diameters; with cross and stadia wires of platinum not to exceed 2/10,000 inch in diameter; stadia wires fixed so as to subtend on the rod 1/100 of the horizontal distance from the center of the instrument to the rod, with a tolerance of plus or minus 0.3 percent without using the constant f plus c. The telescope level vial shall have a sensitivity equivalent to 30 seconds of arc for 2 mm space of 1/10 inch. The vial shall be provided with a suitable means of adjustment so that the line of collimation and axis of bubble may be made parallel to each other and perpendicular to the vertical axis of the instrument, and provided with means of locking when in adjustment.

The limiting angle of resolution shall not be more than 5 seconds. Suitable objective and eyepiece caps shall be provided. With the telescope set on a definite point, the clamping of the clamp screw

shall not move the cross wires more than 1 minute. Means shall be provided for adjusting the cross wires with the optical axis of the telescope. If the pinion mount, or saddle, is attached to the telescope tube with screws, it shall also be sweated.

D-2a. ABERRATION. The system shall be sensibly free from spherical aberration, chromatic aberration, astigmatism, coma, curvature, and distortion, and there shall be no sensible internal reflection. The definition shall be excellent.

D-3. STANDARDS. The standards shall be of a type regularly supplied by the manufacturer and offered to the public generally, securely mounted on the plate or integral therewith.

D-4. HORIZONTAL CIRCLE. The diameter of the circle measured at the edge of the graduations shall be not less than 6 inches, graduated to one-half degree. The circle shall be marked from 0° to 360° in two rows of figures in opposite directions, with two double verniers reading to one minute of arc set 180 degrees apart. At no point shall the verniers be in error with each other by more than one-half the least reading of the vernier.

D-4a. COMPASS. A suitable compass with variation plate shall be furnished, mounted on the plate.

D-4b. PLATE LEVEL VIALS. Plate level vials shall have a sensitivity at least equivalent to 60 seconds of arc for a 2 mm space.

D-5. VERTICAL CIRCLE AND VERNIER. The diameter of the vertical circle shall not be less than 5 inches and shall be equipped with stadia arc when specified in the invitation to bid. It shall be graduated every 30 minutes and numbered every 10 degrees in quadrants from 0 to 90 to 0, etc., repeating this number around the full circle. The circle shall read 0 when the telescope is horizontal and be provided with one double vernier graduated to read single minutes, protected by a rigid guard in such a way that it can be removed without disturbing the adjustment of the transit.

D-6. ADJUSTMENTS AND FINISH. All parts and fittings shall be of design, quality and accuracy commensurate with the graduations and the telescopic requirements. All adjusting devices shall be positive in action. The instrument shall be provided with a dark finish.

D-7. LEVELING HEAD AND FOOTPLATE. The leveling head shall be of the four-screw type with shifting center. Means shall be provided for taking up the wear of the leveling screws, or the design shall provide for easy removal or replacement of worn screws or sockets in the field. The footplate threads shall be 3-1/2 - 8 U.S.S. threads, in accordance with the National Bureau of Standards drawing No. B-1180. On the side of the footplate the following shall be engraved or otherwise permanently marked: "3-1/2 - 8 thds". No adapters will be permitted.

D-8. TRIPOD. The tripod shall be of the extension or non-extension type, as specified in the invitation to bid. It shall be of hardwood and provided with a metal cap. The quality of the tripod shall not be less than the manufacturer's standard production for this class of instrument as usually offered to the general public. The tripod shall be threaded with standard 3-1/2 - 8 thread, National Bureau of Standards. Each tripod head shall be permanently marked on the side as follows: "3-1/2 - 8 thread, National Bureau of Standards". The wing nut bolts shall be so constructed as to prevent turning when the wing nut is being tightened. A washer shall be placed under each wing nut.

D-9. CARRYING CASE AND ACCESSORIES. A substantial hardwood carrying case with carrying strap, brass hooks, lock and key shall be furnished to protect the instrument against damage when transported in the field. The following accessories are to be furnished, fitted into the case: waterproof hood, plumb bob, reading glass, adjusting pins, screw driver, oil container, necessary wrenches, sunshade, instruction booklet, 2 extra level vials (1 for telescope and 1 for plate) and any other standard accessories usually furnished to the general public.

D-10. SHIPMENT. All instruments and tripods furnished shall be suitably packed or crated for shipment. The contractor shall be held responsible for items damaged in transit due to lack of, or inadequate, protection.

E. TEST REQUIREMENTS

If it cannot be determined from the information furnished with the bid whether the instrument offered is capable of performing the described service, the instrument will be subject to test during a trial period of one month under these actual working conditions. Payment and final acceptance will be withheld unless and until instrument is proved successful during such trial period.

If prompt payment discount is offered the payment period will be reckoned from date of final inspection and acceptance at point of delivery. The Government reserves the right to accept the instrument only after a field inspection and a test trial at point of delivery. If the result of this test shows noncompliance with specifications the Government reserves the right to have the equipment tested by the National Bureau of Standards.

In the event the instrument tested fails to satisfactorily perform the work during the test period, the instrument will be rejected and turned over to the manufacturer in whatever condition it happens to be at the end of the test. The contractor will be required to pay all charges incident to the return of the rejected instrument.

The Government will not be liable for any damage to the instrument as a result of such test, provided such damage is not due to accident or other causes not in accordance with normal or usual care of such equipment.

F. QUESTIONNAIRE FOR ENGINEERS' TRANSIT (WITH OR WITHOUT STADIA CIRCLE), COMPLETE WITH TRIPOD AND ACCESSORIES

No bid will be considered unless accompanied by the following questionnaire fully completed by the bidder.

IMPORTANT NOTE: The bidder guarantees the instrument to have a precision and accuracy, as well as to be of the quality and workmanship, not less than that described in his reply to the following:

F-1. Make _____, Model Number _____

F-2. Weight of instrument only as offered _____ pounds.

F-3. Telescope: Length of telescope:

Ocular to objective _____ inches.

Overall _____ inches.

Type of telescope: Erecting _____; Inverting _____

Focusing Mechanism: Internal _____; External _____

F-4. Pinion mount, how attached _____

F-5. Cross wires, material _____

F-6. Telescope spirit level:

Length of vial _____ inches

Sensitivity per graduation,

Maximum _____ seconds

Minimum _____ seconds

F-7. Magnification _____ diameters

F-8. Field of view _____ degrees

F-9. Exit pupil _____ mm

F-10. Limiting angle of resolution _____ seconds

F-11. Object: Effective aperture _____ inches

F-12. Vertical Circle, diameter _____ inches

How graduated _____

Vernier: Type _____

Graduation _____

Reading to _____ minutes

F-13. Horizontal Circle, diameter _____ inches

How graduated _____

Vernier: Number of _____

Reading to _____ minutes

F-14. Compass, length of needle _____; Type of center bearing _____ _____; Ring graduated to _____ degrees on _____ _____ material.

Is glass cover for compass box watertight? (yes or no) _____

Removable? (yes or no) _____

F-15. Leveling head, type _____

F-16. Footplate. Is footplate one piece? (yes or no) _____; Size and threads _____; Marking _____

F-17. Level vials, sensitivity per graduation,

Maximum _____ seconds

Minimum _____ seconds

Graduation _____ mm

F-18. Clamp screws. Will clamping or unclamping of any clamp screw move either cross wire more than 1 minute from the point? (yes or no) _____

F-19. Tripod, extension type (when required in invitation to bid):

Length, extended _____ inches

Length, non-extended _____ inches

Weight _____ pounds

Manufacturer _____

Model _____

F-20. Tripod, non-extension type (when required in invitation to bid):

Length _____ inches

Weight _____ pounds

Manufacturer _____

Model _____

F-21. Accessories. State if accessories listed in the specification are supplied. (yes or no) _____

F-22. Carrying Case. Is carrying case furnished in accordance with specifications? (yes or no) _____

F-23. The engineers' transit we propose to furnish under this invitation to bid, deviates from the specification requirements in the following particulars:

_____

_____

_____

_____

F-24. It is agreed that in the event deviations are not listed or filed under paragraph F-23, the right is reserved by the Government to demand full and complete compliance with the specification requirements.

Signature _____

Title _____